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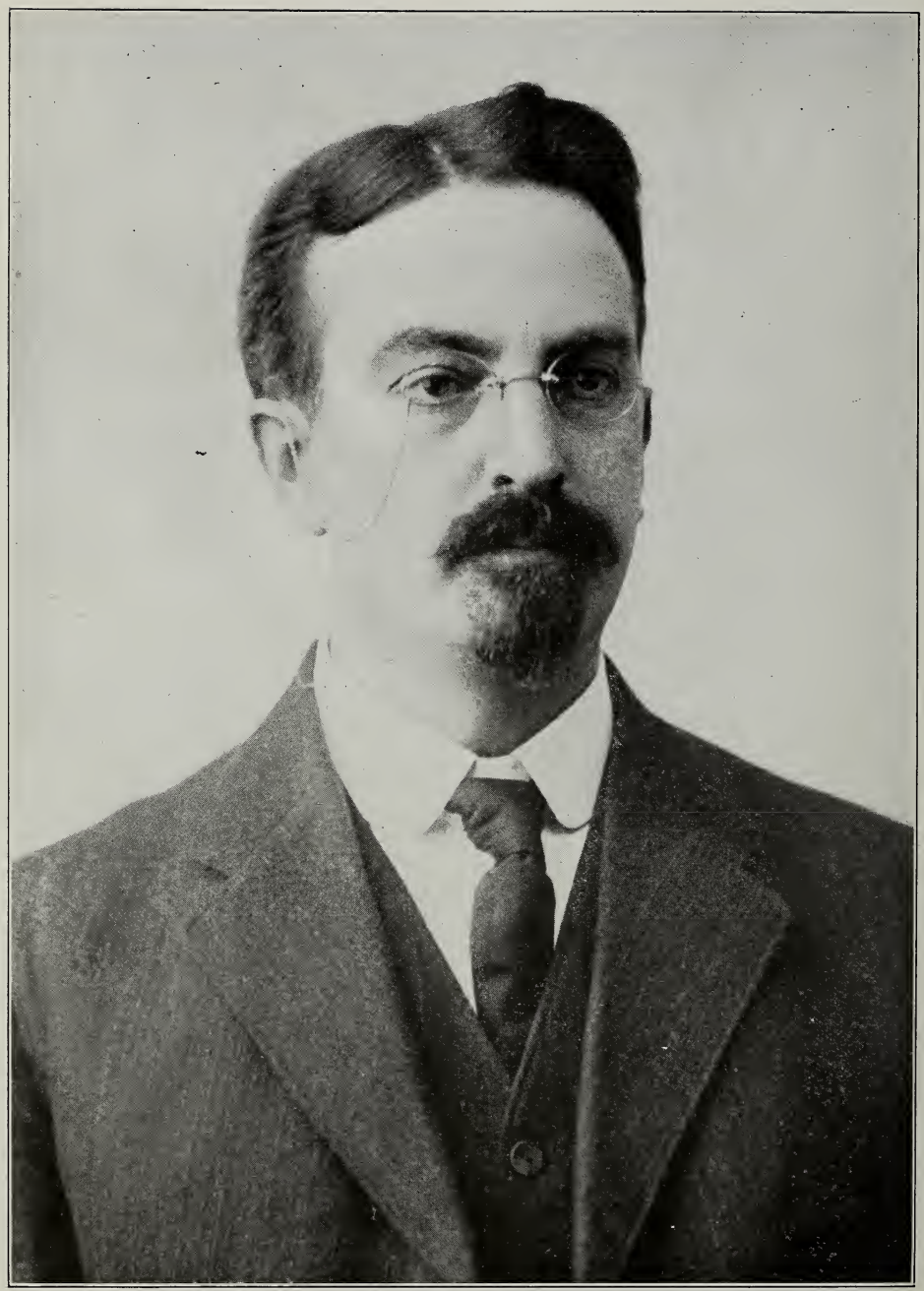


ALFRED VIVIAN

Appointed Dean of the College of Agriculture, November 6, 1915.

THE AGRICULTURAL STUDENT

Vol. XXII. OHIO STATE UNIVERSITY, COLUMBUS, NOVEMBER, 1915 *No. 3*

PROFESSOR ALFRED VIVIAN CHOSEN DEAN OF COLLEGE

Head of Agricultural Chemistry Department to Lead Agricultural Activities at Ohio State; Was Associated with King, Russell and Babcock During Student Days at Wisconsin University.

"BECAUSE of his loyalty to Ohio and to Ohio State," the trustees of the University, on November 6th, appointed Prof. Alfred Vivian, head of the department of agricultural chemistry, dean of the college of agriculture.

Dean Vivian was born March 14, 1867, at Mineral Point, Wis., where he received his secondary education in the Mineral Point high school. His father, John H. Vivian, was prominent in public and political life of Southwestern Wisconsin and served in the legislature of that state during the stormy period of the Civil war.

Dean Vivian's supreme interest has always been in agriculture in its broadest sense. At the age of 18 he spoke at farm institutes in Wisconsin, introducing especially the silo and its uses.

He was graduated from the University of Wisconsin in 1894 and spent most of the following eight years as an associate and assistant to Dr. Moulton S. Babcock, head of the department of agricultural chemistry at that institution, who at this time was perfecting the famous Babcock milk test. Prof. Vivian was associated with Dr. Babcock, Dean H. L. Russel and Prof. E. G. Hastings of Wisconsin Agricultural College in their early studies on milk and cheese, and published at that time a number of papers on various phases of those subjects. He was also closely associated with Prof. F. H. King in his achievements in soil physics. Prof. Vivian feels that he was unusually fortunate in being closely associated with such master scientists as Babcock, Russell and King.

Developing an aptitude for teaching, the instructional work in agricultural chemistry at Wisconsin was turned over to him while he was still in an undergraduate position. In 1902 he received a call from Ohio State University to the position of associate professor in the department with Henry A. Weber, who served the University so long and faithfully as head of the department of agricultural chemistry. In 1905 he was advanced to the rank of professor and made head of the department.

In the early days of the extension work of the University, Prof. Vivian was a source of strength to the movement. During the first year of extension service he spent the greater part of his time in the field; and to his interest in that work, as well as his influence with the younger instructors, is due the success of the extension school movement. He has always been a staunch supporter of the winter course, Farmers' Week and all of the shorter and popular courses. In a recent address he said: "I believe in taking the farmer or his son for a day, a week, eight weeks, or any number of years and giving him in that time the greatest possible amount of careful instruc-

tion.'' On another occasion: ''The campus of the University is the whole State of Ohio. The slogan of the University is 'Service to Ohio.' ''

In 1905 he published a pamphlet entitled ''Principles of Manuring,'' which was afterwards enlarged and published under the title of ''The First Principles of Soil Fertility,'' a book which has been widely read both in this country and abroad, as well as being used as a text-book in several institutions. Its clear, concise, expository style has made an appeal to the busy man of both the farm and city, invigorating those features which make for a prosperous and permanent agriculture.

Prof. Vivian is a firm believer in the mission of the Grange, as attested by an article in a former issue of The Student. He is a member of the University Grange, the Franklin County Pomona and has received both state and national degrees.

In 1912-13, while on a year's leave of absence, Prof. and Mrs. Vivian made a tour around the globe, traveling 42,000 miles, visiting 21 countries and studying agricultural conditions from a farmer's viewpoint. During this time he spent several months with Samuel Higginbottom, who was graduated from Ohio State in 1911, preparing and introducing agricultural work at Ewing Christian College at Allahabad, India.

He has been sharing his trip with others since his return by means of illustrated lectures, in which he uses slides made from 3000 photographs taken while abroad.

Prof. Vivian is a member of the following organizations: American Chemical Society, Association of Official Agricultural Chemists, American Association for the Advancement of Science, Society for the Promotion of Agricultural Science and American Society of Agronomy. He has twice been a delegate to the meetings of the American Association of Agricultural Colleges and Experiment Stations.

In his new capacity, Dean Vivian will probably continue that part of his work which he loves best—the instruction of the younger students in the college of agriculture in the elements of agriculture in relation to soil fertility.

At Ohio State he has shown himself to be a consistent worker, a broad, enthusiastic and successful teacher. His sympathy with the students both inside and outside of the classroom has been an important factor in his success. Always ready, always willing, always interested in bringing out the best in the college, he will prove efficient, capable and eager to lead the students of agriculture and farmers of Ohio to a deeper realization of the value of agricultural education and the necessity of developing the latent possibilities of the foundation for prosperity—the soil and its fertility.

When asked what the policies of the college would be under his administration, he replied: ''No one man makes the policies of the college, for they will be the combined judgment of all the members of the faculty.''

He has declared that he will not enter into commercial relations nor become allied with any function other than those directly connected with his office, but direct his undivided attention to the work of the college.

Dean Vivian enters into the leadership of the college with the confidence of all the students, with the admiration of the farmers of Ohio and with a training that makes him particularly capable in executing his duties. His loyalty to Ohio State is exemplified by his refusal of four other collegiate and commercial offers within the past year, maintaining that ''Ohio is good enough for me.''—[The Editors.]

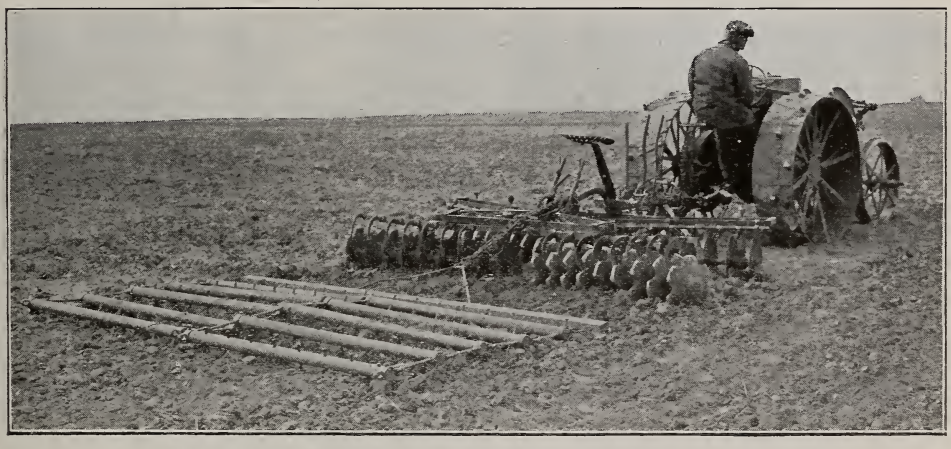
FARMING WITH MECHANICAL POWER

How the Gas Engine Has Increased the Efficiency of Labor.

RAYMOND OLNEY, Editor of "Gas Power," St. Joseph, Michigan

It is less than twenty years since the first stationary gas engine went to the farm, and less than ten years since the first gas tractor made its appearance. Yet today the American farmer uses more gas engine horsepower than all the industries of the world combined. One authority predicts the profitable use of thirty to forty million engine horsepower on the farms of this country.

Power farming is attracting widespread interest among progressive farmers. I did not realize that this interest was so keen until after visiting several of the tractor demonstrations during the past season. Farmers in automobiles came from many miles and still others came from several adjoining states by railroad to see the leading makes of machines exhibited at these shows. Practically all of the tractors



"One Operation Prepares the Seedbed."

Nearly every farmer uses a stationary gas engine of some sort, and a large percentage of farm owners or operators can, at the present time, find profitable use for a gas tractor. The stationary engine has developed into a reliable, practical machine that will make possible an enormous saving in time and labor on most farms. While no definite type or size of gas tractor has yet been settled on for the average corn belt farm, tractors have reached such a stage of development that the farmer can be sure of getting a machine that will be practical, reliable and a paying investment.

entered made a good showing, and the farmers bought them like "hot cakes." Judging from my conversations with several of the leading manufacturers, their main problem right now seems to be to produce the machines as fast as they can sell them.

This indicates that there is no question about the farmer being alive to the possibilities of power farming. But it is, of course, not surprising, for every intelligent farmer is only too ready to take up with a new machine when it is sufficiently demonstrated to him that it will save time and labor, help him put in and harvest his crops at the right

time, and, therefore, increases his labor income.

Most farmers use mechanical power in some form or other with which to farm. They use stationary gas engines to run such machines as cream separators, churns, milking machines, corn shellers, feed grinders, fanning mills, grain elevators, electric light plants, pumps, small sawing outfits and grindstones. They need gas tractors for such field work as plowing, disking, harrowing, seeding, harvesting and various kinds of hauling, and for such belt work as operating silage cutters, buzzsaws, threshing machines, feed grinders and lime pulverizers.

More uses are continually being found for both the stationary engine and tractor. The tractor was used at first principally for plowing and threshing. It is now being adapted to a much greater variety of farm work than was thought possible a few years ago. While it will not do all the work that can be done with horses, it is much more suitable for the heavier jobs, such as plowing, disking and harvesting, where the greatest amount of power is required, and where it is most essential that the work be done at the right time.

For some time farmers have felt the need of more power for doing farm work. The federal government, through its department of agriculture, and the agricultural colleges and experiment stations, has done much to encourage and promote the introduction of better and more intensive methods of farming. But not enough emphasis has been laid on the fact that to increase the producing capacity of a farm, one of the fundamental and most important requirements is power and machinery.

More intensive agriculture calls for improved labor-saving machinery and the necessary power to operate it. For the most part, successful machines and implements have been developed to meet this need, but horses have their limitations in the matter of furnishing the power to handle them properly. For the heavier farm work they have not proven equal to the demands that the farmer is making upon them. He himself fully realizes that mechanical power must, and is, going to take the place of animal power, particularly for the heavier work.

The tractor and the stationary engine must not be thought of as a means of entirely replacing horse power on our farms, but they will supplement horse power for work where more power is needed than the average farmer is able to provide at the present time. To meet the power needs effectively at rush seasons of the year, the farmer cannot afford to keep the extra horses necessary to furnish the required amount of power to handle the work properly at these times. Horses have to be fed whether they are working or not, and consequently the farmer must limit himself in the number of horses which he can feel justified in keeping the year round.

With a tractor this is a decidedly different proposition. Even if he has a few extra horsepower tied up in the machine, it costs nothing to maintain them during the slack seasons of the year.

I believe it is quite universally agreed among those interested in this power farming idea, and this includes all farmers who are thinking tractor, that the biggest advantage of this kind of power is that it permits the farmer to do his work at the right time, and also to do it in a hurry. I talked with farmers at the power farming demonstrations this past year, and this advantage seemed to be as important to them as any. This feature would naturally have been more important during the past season than ordinarily, for the reason that farmers

were hindered to a considerable extent by adverse weather conditions.

The man who farms with mechanical power, that is, the man who uses engines to do his farm work, has a big advantage over the man who uses horses only, particularly in the spring of the year. At that time horses are soft and out of condition, due to the long period of idleness through the winter months, and they cannot be worked as hard as they can later on in the season. This is a serious disadvantage in that plowing, preparing the seedbed and seeding are usually seriously delayed, and especially so if weather conditions are not favorable, as is quite apt to be the case at that time of the year.

With a tractor this problem is decidedly different. It does not get tired from heavy work, and when necessary can be worked at least twenty hours a day. Most power farmers can wait until the soil and weather conditions are right, and then go into the fields with their tractors and do the work in a hurry, usually in from one-half to one-third the time that they could ordinarily do it with an equivalent number of horses.

In this connection the tractor has a distinct advantage over horses in that the various field operations can be combined and some unnecessary trips over the field saved. For instance, if the tractor is powerful enough, it can be made to plow and prepare the seedbed in one operation, or disk, harrow and seed at the same time. When it comes to harvesting, which is another period of the year when it is important to rush the work with all possible speed, frequent stops are not necessary, and the work can be pushed to much better advantage.

"The Tractor Will Operate From Dew to Dew."

A few years ago I helped to harvest several hundred acres of spring wheat and oats with a tractor and binders. When the grain had reached the proper stage for cutting, the outfit was operated from dew to dew, and the entire acreage was cut and bound in much less time than if the same binders had been operated by horses.

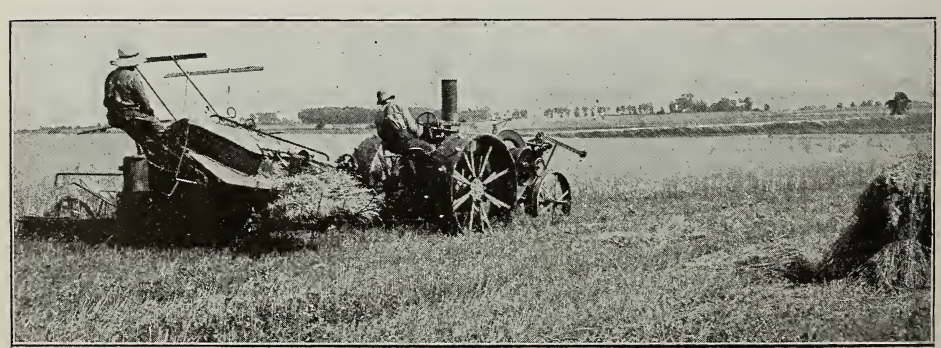
At the present time there is a brisk demand for the very small tractor—a machine that will haul from one to two

plows. For the average corn belt farmer it is questionable if a machine as small as this is practical. I am very confident that many farmers are going to make the same mistake in purchasing tractors that they made when they bought their first stationary gas engine. That is, they are going to get them too small.

A tractor which is capable of pulling four plows under average conditions, and three plows under practically all conditions, is none too large for the average corn belt farmer. It is very important that he have plenty of power, for there are a great many times when it is a big advantage to have a few extra horsepower available. Particularly is this true in plowing, where it is oftentimes desired to haul smoothing harrows or disks, and perform at one operation the work that ordinarily requires two or three extra trips across the field where horses are used.

In purchasing a tractor the farmer should aim to select one which will fit the character and size of the farm. For a farm of less than 100 acres a tractor which is capable of handling two and three plows easily will usually be about the right size to buy. But on farms of 100 acres to a half section the machine which will pull readily three and four plows will be found to be the best paying investment.

Gas power—the stationary gas engine and the tractor—will be the means of revolutionizing agricultural methods and farm life to a much greater extent than has been true of any other farm machine. It will solve more satisfactorily the big problems of labor and power. It will, of course, require a better, more up-to-date organization of farm operations, but the whole effect of farming with mechanical power—power farming—will be to make farm work easier and more profitable, not for the farmer alone, but for his wife and children as well. It will also mean that more boys and girls that really should stay on the farm, will remain there. The adaptation of mechanical power to farm work is the biggest single thing that has ever come to the aid of the farmer to make his work less of a drudgery and his profits greater.



THE DESCENT OF THE TRACTOR

Horsepower at the Drawbar of the Tractor Costs But $90.

GEORGE P. WHITSETT, Chicago, Illinois

IT is proper to speak of the descent of the light tractor, for the small oil-burning form of farm power which has attracted wide attention during the last twelve months was reached only by degrees after the large tractor designed for farm operations on a large scale had been perfected. It is not difficult to understand why the large tractor should be produced first, for large farmers are more accustomed to watching the average farmer, the manufacturer reached it by degrees. As he came down from the 30-60 H. P. tractor he produced the 20-40, 15-30, 12-25, 10-20 and 8-16. The small tractor not only immediately attracted the attention of farmers and editors, but it started something among the manufacturers The field soon became full of small tractor makers. Men began to have visions of a tractor on every farm, with

"A Tractor With Guiding Device."

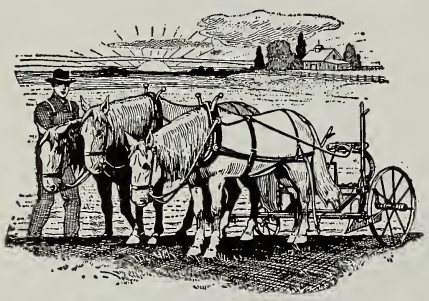
the leaks in their profits and are financially prepared to make any changes for cheapening and improving their methods.

Just as the large tractor was produced to meet the specifications of the large farmer, so the light tractor has arrived upon orders from the average farmers with the average sized farms. The small farmer became power hungry when he saw the factory methods which the large farmer was able to inject into his farming after he was equipped with mechanical power.

In his effort to build a tractor for immense profits for the manufacturer who could get in the field first with a successful machine. This activity was not limited to reputable and experienced companies, but men who had never made a tractor, or any kind of farming machine, set out for the tractor gold field. Already there are more than one hundred makes of small tractors being built.

The light tractor is here, however. It does the work and stands up under severe farming conditions, and the farmer can safely invest in it if he makes a wise selection. This wise se-

lection is the hard job, but we have a feeling that the farmer will come out all right. A man from the U. S. Department of Agriculture told me not long ago that in studying complaints of tractor owners he found in the neighborhood of one hundred farmers who had bought a very light, very cheap tractor, which had stood up only about a year, and which is now no longer manufactured. Yet, he said, hardly a



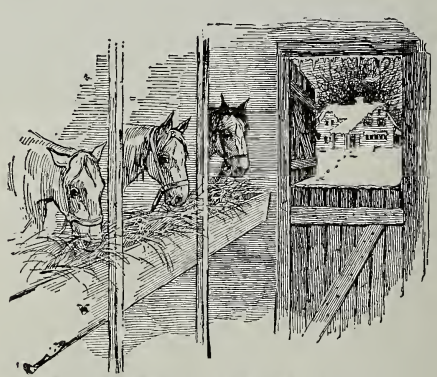
An Expensive Farm Power.

man was sorry or dissatisfied, but was glad he had made the purchase. "We have learned a lot about running a tractor,' they said, in effect, "and now we can buy a good one, which we are going to do."

The farmer is a pretty hard man to fool, and we do not believe he can be fooled in the tractor game very long. Practically the only dangers are that he will buy from a company which can not furnish him with extra parts quick enough through its dealers, that he will buy from a concern which will pass out of business in a year or so, leaving him an orphan tractor on his hands, and that he will buy some one of the numerous freak tractors which are suited only to some special condition, and which do not apply economically to the rank and file of his power jobs.

Take, for instance, the great variety of "basic" ideas in driving the tractor. If you will look over the field, you will find at least nine different arrangements employed for giving the tractor traction. You will find several instances of single drive wheels occupying various relative positions in the tractor's anatomy, as follows: In one instance the drive wheel will be located at the rear on one side; again it will be at one side in front; and in other instances it will be behind ,occupying a half-way position. In most of these instances we have a three-wheel tractor and a one-wheel drive. There is one known instance of attempting to have two drive wheels, but to have them in front—front driven and rear steered. One tractor was at least partly developed with four wheels and every one a driver. It is said that this tractor could walk on water or climb trees, so powerful and efficient was its driving mechanism, but the cost of building it was prohibitive.

At least three types of caterpillar propulsion are in use: one with two tracks behind and two small wheels in front; another with one track behind, centrally located; and still a third with no front or rear wheels, just the cater-



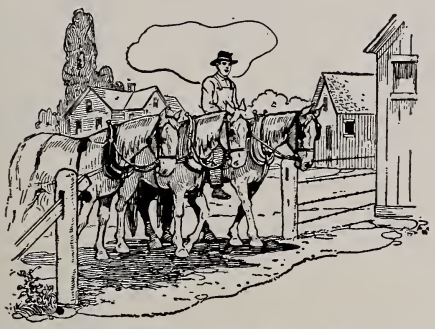
Horses Eat All the Year 'Round.

pillar tracks. Finally, we have what many people call the standard way to drive a tractor, namely, two front wheels and two drive wheels in the rear.

Authorities say that if you will analyze the special constructions suggested

above, you will find that they have been designed for some special purpose or condition. Some types are particularly fitted for some one form of work, like plowing, but will fall down miserably if put to work dragging heavy harrows over plowed surfaces. Some types are designed to fit some specific conditions, such as bogs, sandy soil or steep hills.

The next few years will doubtless see the tractor industry go through a period of refinement, such as the automobile business has recently endured, and it is the opinion of many that most of the highly specialized types will be weeded out. It looks reasonable that the standard tractors which will fit the average conditions perfectly and fit fairly well special conditions, grading off on either side, will be the tractors which will commend themselves to general use and which will represent the type when it is finally fixed.



When the Horses' Work Is Done You Still Have to Take Care of Them.

A great many manufacturers, in their haste to produce a light tractor, have mounted a gasoline engine, apparently not stopping to think that gasoline is a costly fuel and growing scarcer every year. On the other hand, some of the makers who have been with the tractor from the beginning have been working for years on engines that will burn kerosene and the cheaper petroleum products. The head of the manufacturing department of a large oil company stated recently that this country is facing, within the next few years, the greatest gasoline shortage it has ever known. He also said that the new process of refining enables the manufacturer to convert from 50 to 60 per cent of the crude oil into the finished products of kerosene and gasoline—the relative amounts of kerosene and gasoline breaking about even. When we consider that there are already two million automobiles in this country and hundreds of thousands of stationary and portable engines burning gasoline alone, we can see how opportune it will be to have the farmer's tractor operate on the more plentiful and cheaper fuel —kerosene. Even now the difference in demand is shown by the fact that kerosene sells for practically one-half as much a gallon as gasoline.

In addition to its attractive price, kerosene has many other merits. Contrary to popular belief, it actually contains more heat units than gasoline, and hence can furnish more power at a cheaper price for the farmer who has a kerosene-burning engine. Furthermore, there is not so great a waste from evaporation when kerosene is used as

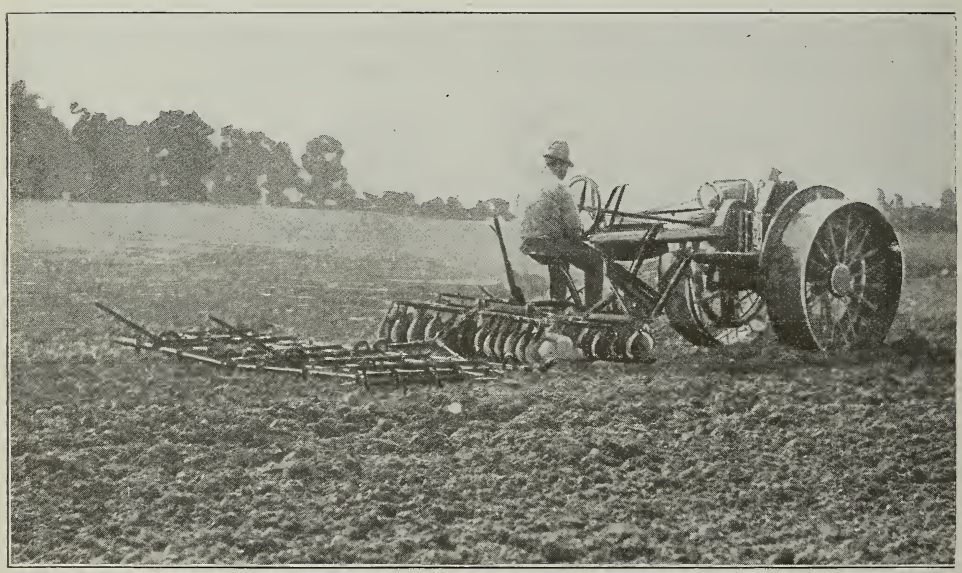
The Tractor in Its Little Shed Needs No Attention.

when gasoline is the fuel. One of the most noticeable qualities of gasoline is its rapid evaporation, and it is no comfort or profit to the tractor owner to see this most expensive of tractor fuels pass up into thin vapor. It is this very evaporation which makes gasoline such a dangerous commodity to keep about the premises. Fire insurance rates must be increased if gasoline is kept around the place.

These are the main considerations which interest the average farmer, as he is already convinced that the high cost of horse and horse feed are getting such as to make him take a lively and growing interest in tractors. He probably does not know that the average horse, while working only one hundred days a year, consumes the returns from five acres of land, and that for every eight horses kept on the farm a forty must be devoted to their nourishment, but he does know that keeping horses is expensive.

As soon as the farmer finds out for sure that a horse power at the drawbar in horseflesh costs on an average $150, while a drawbar tractor horsepower costs from $85 to $90, and when he puts this figure along with the saving he can make in fuel, then the slogan, "A tractor on every farm," will be pretty hastily realized.

We believe in the farmer and in the tractor, and we think the two are going to get together.



Drawbar Tractor Horsepower Costs But $85 to $90.

THE RELATIVE ECONOMY OF GASOLINE AND KEROSENE

When Used as Fuels in Internal Combustion Engines.

GEORGE W. McCUEN, Ohio State University

THE internal combustion engine has come to stay, and has met with great success as a means of supplying power for the various needs on and about the farm. The internal combustion engine differs from the steam engine in two essential particulars. In the first place, the medium used is air, and in the second place, the fuel is burned directly in the cylinder. Nevertheless, it is the heat generated by the burning fuel that does the work.

A great variety of fuels are used in internal combustion engines, and the most important of these are derived from petroleum. Crude oil as it comes from the ground is unfit for use and must be refined either wholly or in part. The principal products of petroleum used for fuel in gas engines are obtained by a process of fractional distillation in which the oil is maintained at a certain temperature, or within a given narrow range of temperatures, until as much as possible will vaporize. The vapor is condensed and received in containers.

Pennsylvania Crude.			Western Crude.		
Product.		Per Cent.	Product.		Per Cent.
Gasoline Benzine Naptha	Commercial Gasoline	16 - 18	Gasoline Benzine Naptha	Commercial Gasoline	2.5 - 5
Kerosene		45 - 52	Kerosene and Distillate		35 - 40
Lubricants		15 - 18	Lubricants		30 - 35
Residium		16 - 18	Residium		22 - 26

An inspection of table No. 1 will show the relative percentage of the different products obtained from crude oil.

It is clearly seen that a greater percentage of kerosene is obtained from the distillation, and in connection with the enormous consumption of gasoline, the manufacturers have designed and placed on the market engines adapted for the burning of kerosene and attachments for converting gasoline burning engines into kerosene engines.

The conversion of a gasoline engine into a kerosene or distillate burning engine may be accomplished in two ways. The first method is to simply change the carburetor or mixer, and the second method is to obtain the regular attachments necessary for the change from the manufacturer of the engine in question. These parts generally consist of a new cylinder head, having the kerosene carburetor cast integral with it; a device for preheating the air for the mixture and parts for changing the method of governing from hit-and-miss to that of volume governing. On some engines a fuel pump will be necessary to supply the kerosene to the carburetor.

When using the lower grades of fuel the engine requires a trifle more attention just after starting, until it becomes warmed up; after that the two types of engines will require about the same attention.

With the lower grades of petroleum products for fuel, water must be injected with the mixture to prevent pre-

ignition, and the amount injected varies with the load the engine is pulling. The calculations are based on the horse power hour.

Table No. 2 is made up from data obtained from tests on three different six horse power engines. Engine No. 1 was a cheap grade engine and was converted into a kerosene burning engine by changing the mixer only. Engine No. 2 was a high grade engine and was changed from burning gasoline to kerosene by changing cylinder head method of governing, adding a fuel pump and a device for preheating the air for the mixer. Engine No. 3 was a typical high grade kerosene burning engine.

Engines Nos. 2 and 3 having preheated air for the mixture, were able to take their loads on kerosene as soon as the exhaust pipe was sufficiently warm to heat the air, while engine No. 1 had to be well warmed up on gasoline before turning in kerosene as a fuel. All engines were started on gasoline.

It is seen that the cost of operating one hour was much less for kerosene than for gasoline. However, it should be borne in mind that the kerosene engine requires a little more attention after starting, while the gasoline engine requires none whatever. so if the period of operation is of a short duration, gasoline is the better of the two fuels, while kerosene adapts itself for periods of long duration and the cost of operation is much less.

Engine.	Fuel.	Fuel Consumption in Pints Per H. P. Hour at Various Loads.				Cost of Operating Per Hour in Cents on Different Fuels. Gasoline, 16c; Kerosene, 8c Per Gallon.			
		¼	½	¾	Full	¼	½	¾	Full
No. 1	Gasoline	1.502	1.185	1.09	.994	4.50	7.09	9.70	11.93
No. 1	Kerosene	2.032	1.620	1.330	1.354	3.09	4.86	5.97	8.14
No. 2	Gasoline	1.423	1.17	1.068	.988	4.27	7.03	9.60	11.85
No. 2	Kerosene	1.854	1.235	1.311	1.192	2.77	3.71	5.90	7.15
No. 3	Kerosene	1.270	1.033	.925	.935	1.90	3.09	4.16	5.60

"The Tractor Can Be Adapted to Many Uses"

SANITATION IN THE RURAL DISTRICTS

How the Septic Tank Prevents the Spread of Disease Germs.

HARRY C. RAMSOWER, Professor of Agricultural Engineering, Ohio State University

THE city dweller has little occasion to be troubled with questions of sanitation as related to water supply and sewage disposal, except in so far as he may be called upon to pay his share of taxes levied for the construction and support of these necessary improvements. He pours the waste water from his home into the sewer and the city does the rest.

How different in the country! Not only must the freeholder supply, at his own expense, the water, both hard and soft, which his family and livestock require, but he must take care of the waste water from the house and barn. For generations this has been regarded as a simple task. The well has been dug or drilled, a common hand pump put in, and the job completed once for all. The privy was constructed in some sheltered place and left to the care of the women of the household.

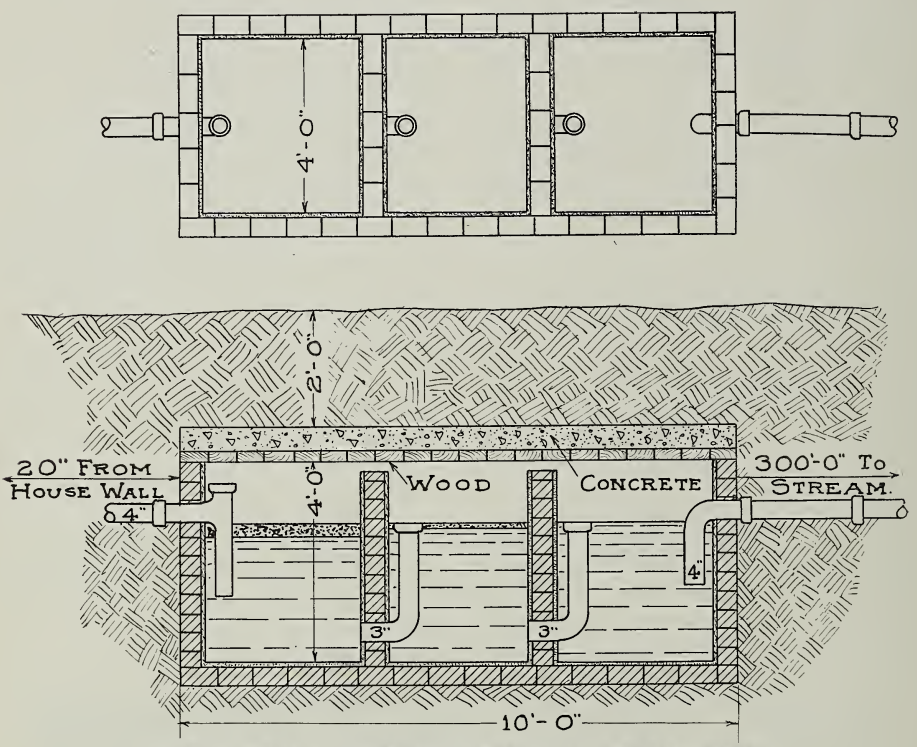
However, though sentiment changes slowly among rural people, it has begun to change in respect to these two factors which, in the end, affect the economy of farm life to a larger degree than we have been willing to believe. We are no longer satisfied to see the housewife go to the distant well or spring and carry bucket after bucket of water for household use. We have discovered that energy and strength consumed in this way could be better utilized in other directions. As a result, we want the water in the house. And once the water is brought into the house, we want a bathroom, completely equipped, which brings us face to face with the problem of sewage disposal.

The first method for caring for the household wastes that appealed to those desiring something of the sort, was by means of the cesspool. This consisted of nothing but a hole in the ground, walled up with loose stones, the bottom being left open. The material entering the pool seeped through the walls and at the bottom into the surrounding soil. It cannot be denied that the cesspool worked, and to all appearances worked well, in the majority of cases. But, there is an element of danger in its use which must not be overlooked. The vein supplying the drinking water is usually not far away and if by chance a visiting friend or a member of the family should discharge disease producing germs, as that of typhoid fever into the sewage system, what assurance is there that the same will not find its way into the well, and from there into the digestive systems of every member of the family? There is a better way to deal with this risk.

The septic tank has come to be regarded as the best method for taking care of sewage disposal from single residences or from large apartment houses. There are a number of tanks that seem to be giving perfect satisfaction, but in this article I shall describe one which has recently been installed by one of our state institute speakers. The accompanying diagram shows the general plan of construction of this particular septic tank. The tank is 10 feet long, 4 feet wide and 4 feet deep, divided into three equal compartments. The two middle partitions extend to the top, but fitting rather loosely, so that air may pass from one compartment to the other. Vitrified paving blocks were used in construction, being plastered on the inside and

bottom with a 1-1 mixture, the surface then being finally washed with a pure cement wash, making the walls almost as smooth as marble. When the tank was finished a plank covering was laid over the top and this covered with reinforced concrete.

From the drawing it will be seen that the tank is located within 20 inches of the foundation of the house. Covered with two feet of earth with a flower bed on top there is absolutely no odor coming from the tank at any time.



A Septic Tank in Successful Operation for Several Years.

The sewage from the house is taken into the first compartment through the tile shown, the inlet ending with a T-joint, the lower branch of the T extending below the surface of the liquid so as to allow ventilation. The first chamber gradually fills as sewage from the house is discharged into it, and when nearly full it begins to seep over into the second chamber through the connection shown. The third chamber is filled in like manner. After the first chamber becomes filled, the anaërobic bacteria begin their work. They attack the solid matter, a part of which rises to the top, forming a thick leathery scum over the surface excluding both air and light. These bacteria work best in the absence of both air and light. They continue to attack the solid matter that enters the tank, decomposing and practically eliminating it. The action becomes more complete in the second compartment, though but little solid matter finds its way into this chamber. If there be any solid matter taken into the third compartment it is further decomposed by the action of the same bacteria. The liquid into the outlet, which consists of ordinary drain tile the majority of the way, leading into a stream some 300

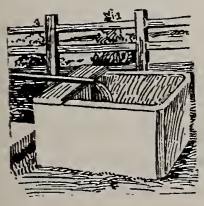
feet away. As the liquid emerges from the end of this tile it is said to be as clear as crystal, absolutely odorless, and in the opinion of the owner of the tank and of the members of the Board of Health who have examined the installation, to be practically pure. Undoubtedly while passing through this line of drain tile it is further purified by the action of aërobic or nitrifying bacteria.

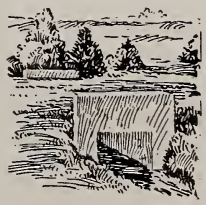
Septic tanks are constructed on the same general plan, being composed of only one chamber, which represents a little less work and expense in construction, but perhaps is not quite as satisfactory from every point of view as the double or triple chambered tank.

It may be said that a tank similar to this which has been in operation for eight years, and which has taken care of sewage from a three-family apartment, was opened for examination and for cleaning purposes. A leathery scum some two or three inches in thickness, was found in the first compartment and in the bottom of this section there was not to exceed a double handful of sludge. In the second compartment there was very little scum and practically no sludge. In the third compartment there was neither scum nor sludge. The owner of the tank above described feels that he will not have to open the tank for cleaning purposes for at least ten years.

There is always a considerable amount of gas escaping from the decomposing solids for which a vent must be supplied. In this case the gases were permitted to pass back through the inlet pipe, going through the upper branch of the T-joint and passing out the soil pipe at the house. I would not regard this as the best plan of taking care of these escaping gases. It would be better, it seems, if they could be taken into the outlet drain, which would be just as satisfactory from every point of view and would avoid the danger of taking these gases into the house through the soil pipe. While there might not be any danger in this scheme, yet there is a possibility of gases escaping into the house.

It will be evident, I think, that the construction of a tank of this sort is so far superior to the common cesspool that no one installing a complete water supply system in a country home should consider the installation of anything else.






HOLLOW TILE FOR FARM BUILDING CONSTRUCTION

Fireproof Material That Is Adaptable to Many Uses.

SAMUEL W. PHILLIPS, '15, Ohio State University

IF there is any place where buildings should be almost indestructible it is on the farm. There, of all places, buildings are subject to extreme heat or cold, moisture, decay and the danger of fire. The comfort of our rural families demands a house built proof against these ravages. The comfortable and safe housing of stock and the proper storing of crops, make such permanent construction equally imperative. The cost of safe construction returns itself many fold in losses saved.

Hollow tile is slowly but surely coming to be recognized as the material which meets the exacting requirements on the farm. In the process of making it is burned in an intense heat and made so hard and compact as to withstand great pressure. It is likewise impervious to moisture—an additional advantage, which we will at once recognize in certain farm structures, notably the silo. The nature of the finished product, which can be broken accurately with a chisel or heavy trowel, makes it easy to work with on any building, large or small. For years hollow tile have been used in skyscraper and factory construction. What better than this durable, fireproof and most economical of all building materials could be selected for use on the farm?

Hollow tile was presented to the farmer several years ago. The statistics of the manufacturers show that the tile has since been gaining steadily in favor. It is equally popular in all sections, North, South, East and West, for hollow tile is peculiarly adapted to all climates.

Hollow Tile Gives Warmth in Winter.

It is most interesting to note the many and varied ways in which the tile is being economically used. In this state, the first use to which hollow tile was put agriculturally was in silo building. It has been found that, through the coldest winters and driest summers, the ensilage in these modern silos has been kept sweet and juicy and free from mold.

Among other uses, dairy barn con-

struction stands out prominently. Modern chicken houses and hog houses are also noted extensively. In all of these buildings, as in dairies, creameries, milk houses, etc., the question of sanitation is of utmost importance. There is no building material that meets this requirement nearly as well as this hard-burned, non-absorbent, hollow tile.

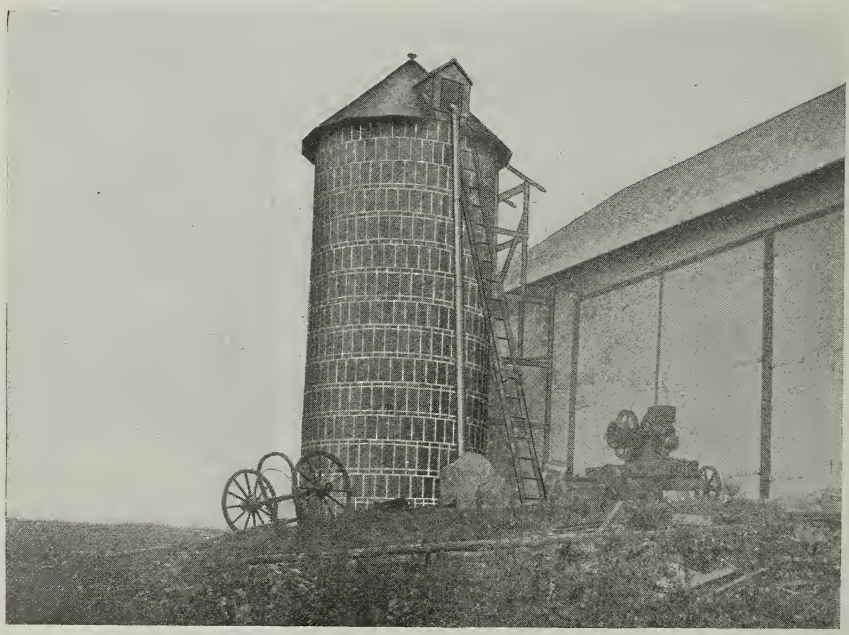
Its use also in a small, but important, Ohio farm structure is particularly interesting. I have reference to the corn crib. For the crib a special inverted "V" shaped tile is made, about 1½ feet long. These are supported, one above the other, at a given distance, in grooves in tile columns. This permits the necessary ventilation, but excludes everything undesirable. The crib can be built in sections to any size desired. A steel roof, with weather-proofed openings for filling, and steel doors, conveniently arranged at the side for removing corn, are provided. This type of crib has many obvious advantages, and will hold shelled, as well as ear corn. Other grains are being stored with equal advantage behind indestructable hollow tile walls. In constructing oat bins, for example, silo tile is used, with the addition of steel reinforcing bands. This makes an absolutely tight bin, thus insuring the best color to the oats.

Not alone is hollow tile used in utility buildings on the farm, such as those we have mentioned, but also in machinery and engine houses, garages, tool sheds, ice houses, carriage houses and manure sheds. It is also gaining in favor for the home side of farm life. Dotted all over the state are farm houses of hollow tile, every one as attractive, durable and fire-safe as the most modern city residences. There are very pleasing indications in this to those who study the problems of farm life. Such beautiful, comfortable homes will unquestionably exercise an influence in keeping the girls and boys on the farm. Is it not fair, too, to give the mother of these children the comforts she so well deserves? And a hollow tile home is the most economical after all. It lasts

Dairy Barn and Silo of Hollow Tile.

for generations, needs no painting or repairs, and most assuredly can be kept warm in the severest weather at the least cost. From a fire-safe standpoint hollow tile is in a class by itself.

Such modern buildings considerably enhance the value of farm property. A hollow tile home or utility building is a permanent asset. Farmers are more and more coming to recognize the many benefits and economies of this building material.



Hollow Tile Requires No Painting.

PERMANENT CONSTRUCTION FOR FARM BUILDINGS

Concrete Is Weatherproof and Makes a Strong Structure.

FREDERICK W. IVES, Professor of Farm Architecture, Ohio State University

PROGRESSIVE people are builders. Every great advance in history has left in its train monuments to mark its progress. Some of the people have left as monuments wonderful and beautiful buildings of such good construction as almost to resist the elements; so good that many are practically intact. These master builders knew the most enduring materials and used them. Concrete, brick and granite have come through the ages intact. Stone is practicable for farm buildings in but few localities. It is used largely for foundations. Frequently we will find small buildings, such as smoke houses, built of field stone, but rarely do we find barns of stone. Cut stone is costly and hence could not be considered for the average farm.

Brick and tile construction is looked upon with favor as a good, permanent and reasonably priced building material. Tile especially has attracted attention on account of its fire-resisting qualities, its strength, lightness and dead-air space insulating feature. Tile has a considerable advantage over brick in the matter of time consumed in laying, if the masons are reasonably familiar with it.

Concrete, when properly handled and made of good cement and aggregates, is almost indispensible in modern building construction. It is fire-proof, weather-proof, and with the addition of proper metal reinforcement makes a very economical and strong structure. Its most valuable property is the readiness with which it may be molded into almost any conceivable shape. Its adaptability makes it serve equally well for tanks and cisterns, or sidewalks, fence posts or culverts. In fact, so wide is its use that the mistake is commonly made of assuming that anyone can make and use it without instruction or training. This has led to much poor work and occasionally a disastrous failure and consequent condemning of an otherwise good material.

Average practice will show that frame construction is good for about 15 to 20 years, taking into account heavy fire losses, weathering and general wear and tear due to use. There are many exceptions to this, of course.

Buildings of a more permanent character and costing but little more than frame, will average 40 years or better; some authorities putting 100 years as the life of a very average brick and concrete building. There is no doubt that careful construction would equal that always. Insurance rates and maintenance cost are reduced to a minimum only in permanent and durable structures.

The modern movement in farm sanitation is demanding sanitary structures as well as means for water supply and sewage disposal. In this movement, concrete has a big part to play. Sanitary and rat and vermin proof floors, septic tanks, well casings, spring houses, water storage tanks are all successfully being built of concrete. These are all permanent improvements, and as such, call for careful and thoughtful planning and construction.

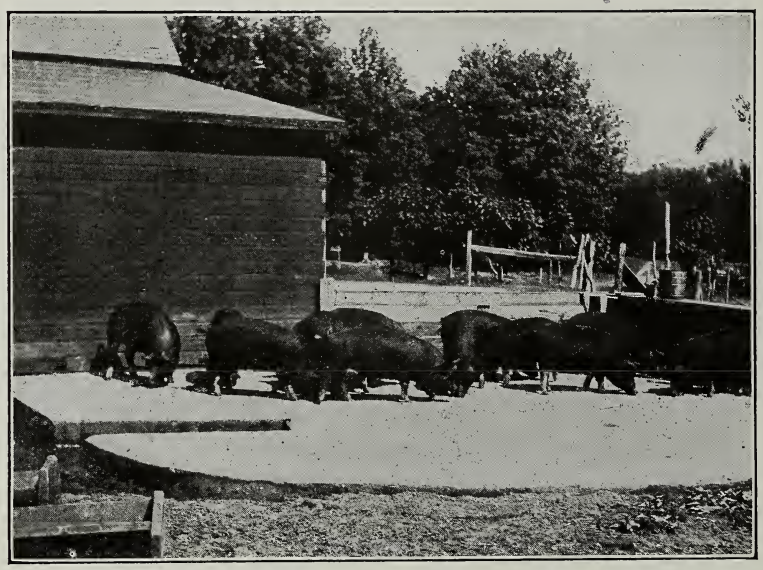
For economy in concrete construction it is necessary to plan not only the structure itself, but the forms and plant for mixing and delivering the concrete. Much material may be wasted in walls made heavier than necessary, or in the

use of masses of materials where reinforcement would give a stronger and lighter construction at a less cost. In the matter of forms, unit construction should be adopted so that the greatest use of the forms will be obtained on any one job. Or better, neighbors may plan tanks, silos and similar structures so that all may use in turn the same forms.

Another economy is the neighborhood mixer, whereby the burden of first cost may be borne equitably by a group of farmers. The mixer, when handled rightly, not only mixes better than can be done by hand, but does it easier, faster and more cheaply.

Careful selection and proportioning is necessary for the best work. Haphazard methods and permanent construction are entirely at odds. All material must be measured and proportioned to fit the conditions under which it is to be used. Standard, well-known brands, such as are advertised in the best agricultural and engineering publications will prove most satisfactory. In case of doubt, have the cement tested by someone competent to do so. Usually the worst failures of concrete are due to poor sand, gravel or stone, or more specifically, to dirt loam or other vegetable matter mixed with them.

Permanence in farm buildings then means not only the use of those materials known to be of permanent character, but a class of workmanship in keeping with the material. Some thought should be given to the principal of good design, so that the permanent structure will not be an eyesore.



Concrete Feeding Floor.

As consumers of cement, American farmers are now using millions of barrels annually. Its introduction upon the farms of the United States has not only effected important economies by the elimination of up-keep costs on all types of structures, but in many instances has represented a direct saving of much that was formerly wasted. For example, a concrete feeding floor will pay for itself in a year or more through the saving of grain, as compared with the wasteful practice of feeding grain upon the ground, where

much of it is lost by being trampled into the mud or dust. The same economy applies in the case of manure pits and structures wherein grain is stored, concrete being so impervious as to afford no harbor for rats, mice or other destructive agencies. Furthermore, concrete is fire-resisting. It does not shrink, warp or decay. These properties have led to the evolution of the concrete silo, a huge jar of solid stone, which can neither blow down nor burn. The average cost of concrete silos has been $2.50 per ton capacity. They preserve contents as well as any other type and have become recognized by all agricultural institutions as economical and satisfactory.

In the matter of small buildings, these structures, as is the case with other structural work on the farm, may be built without employing skilled mechanics. Concrete hog-houses, barns and poultry houses are becoming more common from day to day. In the construction of barns, especially on dairy farms, sanitary precautions are now recognized as absolutely essential, and some of these structures are of unburnable, impervious concrete from foundation to roof. They may be easily cleansed and, as stated above, afford no harbor for rats or other noxious creatures. Being non-absorbent, they do not accumulate filth or disease germs, as is characteristic of frame construction. Concrete is especially valuable in barn floors. In some sections of the country entire barnyards have been paved with concrete. When epidemics occur it has frequently been necessary to destroy wooden structures by fire in order that the disease may be checked. This has led to the use of concrete on an extended scale in some of the large stockyards of the United States. Indeed, the sanitary properties of concrete are such that it is recognized generally by the medical profession as especially desirable in the construction of hospitals.

The strength of concrete increases with time and in contact with water. For this reason the old-fashioned wooden watering tank or trough is disappearing. It is being supplanted by concrete tanks, which also do away with the muddy surroundings usually found about leaking troughs of wood.

Concerning the cost of concrete construction, many improvements can be achieved at remarkably low cost. As an illustration, there were manufactured on a large farm at Upland, Pa., some years ago, hundreds of concrete fence posts. The owner of the farm was obliged to purchase all his material, but notwithstanding this fact, he succeeded in making the posts at an average cost of 23½ cents each, while chestnut posts in the same vicinity cost as high as 35 cents each. Here was a material saving over timber, with the further advantage of a post that would last indefinitely, keep in better alignment than wooden posts, and which could not be destroyed by fire.

Being a plastic material, concrete can be cast in any shape and soon hardens into indestructible stone. Thus, in all structural work on the farm it has proved to be of the highest value.

FARM WATER AND LIGHTING SYSTEMS

Economical Methods of Providing Household Necessities.

C. M. EMERSON, Columbus, Ohio

IF Colonel Goethals, the engineer of the Panama Canal, were given a free hand to put American farming into the highest state of efficiency, he would provide the most comfortable and healthful living conditions before he started on farming operations or even the equipment for the farming. He would make farm living so attractive that those who were there would want to stay there, and those who were not there would want to come.

Imagine an average farmhouse without modern improvements and conveniences. Picture to yourself an average farmer's wife as she goes through her daily routine. Follow every step from the time she starts the fire in the frigid kitchen till she lays wearily down her last pair of mended stockings at night. Now by magic transfer her in her sleep into a house with just the plain conveniences; a heating system, running water, hot and cold, a bathroom with a lavatory, closet and bathtub; a sanitary system of sewage disposal; a power plant that not only pumps the water but runs an electric lighting plant with storage battery, a power washing machine and wringer, a power separator and churn, a vacuum cleaner and perhaps an electric flatiron and a little motor to run the sewing machine.

This picture of farm living is not overdrawn. In some sections a fair proportion of the farms have some of these life and health saving improvements, but the number, compared with the total number of farms is negligible.

Neither is the saving in the wear and tear on a woman's life exaggerated. President Joe Cook of the Mississippi Normal College, in a bulletin of the United States Bureau of Education, makes the rather startling statement that the average farmer's wife has to lift a ton of water a day. Here is how he figures it:

"The getting of the water from the source of supply to the point of application requires more manual labor than any other item of housekeeping. The water for the kitchen has to be lifted from the well, carried to the kitchen, poured into a kettle, poured out of the kettle into the dishpan, and from the dishpan out of doors. This makes six times the water is handled; and a bucket of water containing three gallons, with the containing vessel, will weigh 30 pounds. When this is handled six times, and three times a day, the total lifting is 540 pounds. The cooking of three meals a day on a meagre allowance of water will necessitate ten buckets, which will make, for the cooking alone, 800 pounds of lifting per day. When to this is added the water necessary for bathing, scrubbing and the weekly wash, it will easily bring the lift per day up to a ton, and the lifting of a ton a day will take the elasticity out of a woman's step, the bloom out of her cheek and the enjoyment from her soul."

No farm is equipped for efficient work which does not have a comfortable house with running water, hot and cold, a complete bathroom, a kitchen sink, laundry tubs and slop sink, a lavatory on the first floor if the bathroom is on the second, a sanitary system of sewage disposal and a power washing machine. These should be classed a necessary equipment for every farmhouse.

The average consumption of water by

stock is as follows: horses, 5 to 10 gallons; cattle, 8 to 14 gallons; hogs, 1½ to 2 gallons; sheep, 1 to 2 gallons.

For bathrooms the average is: 1½ gallons for lavatory; 20 to 30 gallons for bath; 5 to 10 gallons for toilet.

A three-quarter hose with solid stream uses 6 gallons per minute. It takes 8 gallons to sprinkle 100 square feet of lawn, 20 gallons to soak it.

From the above any one can figure the amount of water needed.

Human consumption of water runs from 20 to 50 gallons for 24 hours. It is safe to figure on 2 gallons for each person for 24 hours. This covers all household uses, cooking, but not laundry, bathing, sprinkling lawns, etc. Estimate for a family as follows, 5 persons:

5 people	125	gallons
6 horses	48	"
5 cows	60	"
20 hogs	40	"

Total for 24 hours, 273 gallons

A first-class water system for the above would be, for a hydro-pneumatic system: one 36-inch by 8 foot tank, with all gauges, valves, etc., having a total capacity of 420 gallons and a net water capacity of 280 gallons. Assuming the water in the well to be not over 20 feet from the surface of the ground, the pump would be a suction type. A suction type pump having a capacity of 300 gallons per hour, driven by a one horsepower gasoline engine, would be the proper pumping unit for this size plant. This outfit would cost $165. The same tank, but with a higher grade pump and same engine, would cost $190.

The above plant is of the type known as hydro-pneumatic, and seems to be the most successful under all conditions. There is another system known as the pneumatic. This system uses the tank, but instead of pumping water into the tank and allowing the water to compress the air already in the tank, air is pumped under pressure into the tank, and this air goes through suitable pipes to an air pump located at least four feet under water at the source of supply. With the pneumatic system there must be a pump at each source of water supply, while with the hydro-pneumatic, providing the pump is a suction type, one pump can be made to draw water from two or more sources, as, for instance, from the well and from the cistern. The cost for installation is about the same for either system.

Electric Lighting Systems.

Electric light is universally conceded to be superior to any other method of artificial lighting. It is the safest, requiring no matches and having no flame. It is the most healthful, taking no oxygen from the air and giving off no products of combustion to pollute the air. It is the cleanest, producing no soot and making no air currents which deposit dust on walls and ceilings. It is the easiest to install, as wires can be run almost anywhere, in old houses as well as new. It is the handiest, as lights can be located out of reach and switches placed wherever most convenient.

Electric flatirons, toasters, chafing dishes, shaving mugs, curling iron heaters and other small heating and cooking devices are fast becoming household necessities, and can be operated from storage battery systems, provided plants large enough are installed.

Until very recently the use of electricity has been a city luxury. The development of the gasoline engine and the storage battery made the service of the isolated plant equal to that supplied by the central station. The Tungsten lamp, with its low current consumption, reducing the capacity of battery and

size of engine and generator required, and the use of low voltage lamps, reducing the number of cells of storage battery required, have brought the price of the plant within reach of the average owner of a farm or country home.

Speaking generally, home plants are those where the battery is filled during the daytime, and the current is used at night, while the generator is not running; although the generator may be run and its capacity added to that of the battery when an unusual amount of current is required.

Plant for a house of eight rooms and Tungsten lights for about eight hours without the engine running, or with the engine and batteries combined will operate 55 lamps. As to the cost of operating, the engine, under full load, would consume about two gallons of gasoline in 10 hours. But other machinery, such as pump, cream separator, churn or washing machine could be operated by the engine and batteries charged at the same time. Any one of these can be operated while charging, thus reducing the cost to a mere trifle.

There is practically no expense attached to the operation of the dynamo,

the average farm would be about as follows:

For complete plant, comprising 2 H. P. gasoline engine, dynamo, switchboard, storage battery	$336 00
Without engine	$246 00
For wire and wiring house and barn	40 00
A good set of fixtures can be bought for	30 00
Cost without engine	$316 00
If engine is wanted add	90 00
Cost with engine then is, total	$406 00

This plant will operate 13 16-candle

as the oil for the bearings cost very little. New brushes for the dynamo will be needed about once in two or three years, and these cost $1.75 per set.

Enough electrolyte comes with each storage battery for one filling, and this will last a considerable length of time. As the electrolyte gets lower in the cells, caused by evaporation of the water, it will be necessary to fill these cells with clean rain or distilled water.

The depreciation of the storage battery will depend upon the treatment it receives. If it is taken care of, the positive plates will probably have to be renewed in five or six years and the negative in ten or eleven years.

FARM LIGHTING PLANTS

Acetylene, Gasoline Vapor and Electric Systems and Their Adaptations.

C. C. STEDMAN, Delaware, Ohio

MUCH has been said, and much is being said, about the matter of farm lighting plants. Rural residences are demanding better light than can be secured by the kerosene lamp. The problem is a big one, and one that would require much more time and space for a full discussion than the writer is permitted. Therefore I can only deal with this in a general way and give the reader a few things to consider in taking up this question.

First of all, the mass of advertising literature put out is sometimes confusing from the fact that the average purchaser does not know exactly what his requirements are, and by reading the advertising literature he is confused as to which plant is best suited to his purposes.

Having made a careful study of this proposition for a number of years, and having been interested in the results obtained by both the acetylene and electric plants, as well as the gasoline vapor plants, I am convinced that all have a place.

For the small rural home, where very little light is required, and no lights are especially desired in the barn or places where fire is likely to occur from exposed gas flame, and where the only requirements are strictly lighting, and power is not required for other purposes, the purchaser may consider the acetylene plant or the gas plant using gasoline under pressure or gasoline vapor with very satisfactory and economical results. This is preferable to the small, cheap electric lighting plant which is being offered.

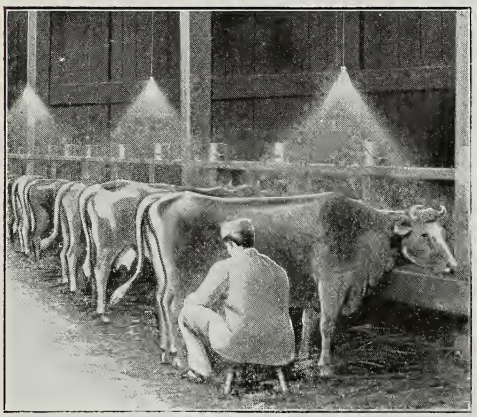
However, this does not in any way condemn the electric storage battery plant for lighting purposes, for if the electric plant is properly put in, of proper size, and where the engine may be used for other purposes, the electric storage battery is preferable, from the fact that the power unit can be made to do innumerable things as well as make the lights, and the surplus of power may be stored in the battery without running the engine any special period to make the lights only. In cases where considerable quantity of light is required, or where light is desired in garages, barns, sheds, etc., the electric light is unquestionably preferable, and if the electric storage battery outfit is properly installed it will give absolutely satisfactory service. In fact, it will give service equal to any of the other plants which can be installed, but it must be remembered that a good storage battery and a good engine and generator cannot be purchased for the same price as an acetylene gas plant.

The approximate cost of the electric lighting plant will run one-third or one-half more, and in some cases even double the cost of the acetylene plant, but it is also of greater value where it can be used to an advantage, or where electric lights are preferred to the acetylene gas.

The following prices, while not covering any special make of electrical equipment, are about as cheap as they can be purchased from any reputable manufacturer, who will put in an outfit and guarantee the results: Acetylene gas plant for the ordinary country residence, from $150 to $250; gasoline vapor plants, about the same price; electric plants, 30 volts using 16 cells with 3 H. P. engine, 1 KW. generator,

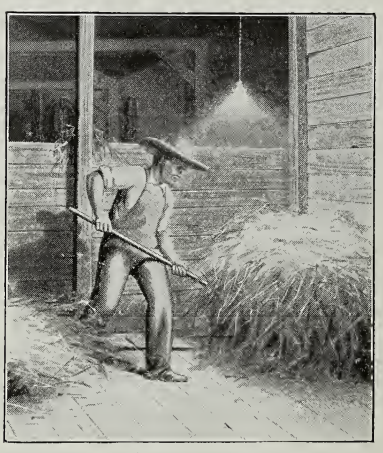
from $300 to $450. Prospective purchasers should not be confused by the statements of many manufacturers and agents when they say that they can put in a good lighting plant for less money.

Therefore, the only safe thing for the average purchaser to buy is a plant



which generally and uniformly has given satisfactory results, for while it may not be generally known to the purchaser, there is a great deal of pioneering and experimenting going on in this field at the present time. In view of the fact that the salesman, or even the manufacturer, does not always know exactly what his plant will do, and since it is easy for him to convince himself and become over-enthusiastic with his own proposition, it would seem advisable that the public should guard against any unconscious misrepresentation of facts and demand a time demonstration before purchasing the small and cheap electric lighting outfits.

The cost of producing the light from the acetylene or the electric light plants will be found about equal, and the maintenance and care required of each plant is about the same. I am persuaded, however, that the electric lights in the future will supercede, in a great many cases, the acetylene gas plants that are now being installed, from the fact that the use of electric current is becoming more and more desirable for lighting, as well as ironing, small heaters, fans, motors, etc., and these are available where the proper size electric light plant has been installed, but they are not at all practical in connection with the small storage battery plant referred to in the first part of this article. The reason for this is that the excessive amount of current used in the irons or heaters, etc., causes a greater discharge on the battery than it can stand. This causes the battery to drain too low, with



its attendant bad results, such as oxidization and warping of the plates, thus shortening the life of the battery very materially. Also, it requires a greater length of time to recharge a battery after it has been over-discharged.

OF

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EDITORIAL

NEW LEADERS IN THE COLLEGE.

With the appointment of Prof. Alfred Vivian as dean of the college of agriculture and Clark S. Wheeler, formerly director of extension schools, as director of agricultural extension, the activities of the college will undoubtedly be given a greater impetus than ever before.

Prof. Vivian has been at Ohio State University since 1902. He was secretary of the college from 1904 to 1910 and acting dean during the year of 1911-1912. He has become well acquainted with Ohio's agriculture, he has studied the requirements of agricultural education, and he has proven a friend to every student in the college. "Prof. Vivian will go out of his way to do a favor for anyone," was the expression used by one student in speaking of the interest which Prof. Vivian has shown in student life. He has devoted much time in work that especially prepared him for the deanship. For eight years he labored at the University of Wisconsin, working out features of the sciences which develop a broad intellectual insight, a keen appreciation and a realization of the best things in agriculture. He has lectured extensively to the farmers of Ohio, meeting with the highest appreciation.

Clark S. Wheeler has been director of extension schools for several years. He has alawys been closely associated with extension work and does not enter into a new field, but simply enlarges the scope of his former work. Last

year the department offered instruction to nearly 450,000 people through the farm institutes, extension schools, demonstrations, etc. This work has been developed extensively within the past few years, and with the appropriations now in view it will soon be greater than the activities of the college at the present time.

With the college as a training school and the extension department as a demonstrational feature, their combined activities will mean more interest in Ohio agriculture. It will mean the complete blending of the ideas of agricultural education, so the farmers of Ohio will have greater opportunity to avail themselves of the benefits of their own college.

THE FARM TRACTOR

Scarcely a month passes in which the agricultural press does not bring forth some new method wherein the labors of the farmer can be lessened or the profits of the farm increased by the use of the mechanical helper—the farm tractor. Before the tractor is guided to the fields in the early morning, it fills the water tank by driving the power pump, or perhaps grinding the feed for the live stock. Then, all through the day it steadily "chugs" away, unmindful of the flies, unweary of the load it pulls, but always responding to the hand of the operator.

So universally has the tractor come into use that power is now applied to nearly every farm operation. According to gas engine experts, the tractor is adaptable to many uses, but care must be taken in using its power. In purchasing an engine, one must be careful to select one which will be large enough to do the required work, as gas engines, unlike steam engines, will stand but little overload. On the other hand, an engine too large for its load will give poor fuel economy.

The tractor situation will probably undergo a series of changes during the next few years which will bring about lines of standardization. They will undoubtedly be divided into three or four general types, depending upon the work they are to perform, just as the automobiles are now divided into the pleasure car, the business car, the light truck and the heavy truck.

While the trend of discussion is said to be along the line of whether the tractor shall supplant the horse, the real question, it is believed by farm mechanics, is to find whether a proper combination of tractor and horse power is not more efficient than either alone. On any general farm there are a good many operations which will require the use of horse power, but undoubtedly the tractor will prove valuable in increasing farm efficiency.

THE FIELD OF FARM ENGINEERING.

Farming might almost be defined as a branch of engineering, if we take the generally accepted definition that engineering is the development of the resources of nature for the use and convenience of man.

As we think over the work of the farmer and of present day agriculture we are impressed with the enormous amount of engineering that enters into it. The farmer no longer simply depends upon nature to supply him with food, but through the assistance of tools, careful planning and forethought he assists nature to furnish him with food and clothing for the masses, who help him only indirectly in this great task by making the tools and distributing and finishing his products. The farmer is the engineer in the produc-

tion of man's greatest needs. The agricultural production of the country depends upon our ability to harness the forces of nature in every form. The farmer must not only utilize physical and chemical forces, but biological forces as well.

The choice of materials for buildings, for roads, walks and fences; the erection of the buildings themselves; the care and operation of machinery, including tractors and automobiles; the selection of a good water supply and the system whereby the water is made available for domestic purposes, for stock and for irrigation; the drainage of land; the disposal of sewage; the installation of farm power, possibly by harnessing some small, swiftly running stream or some waterfall; the industrial use of crops and the utilization of waste products—all these things must be done by the farmer and are truly engineering problems that lie rather in the province of the engineer than in that of the agriculturist alone.

WATER ON THE FARM

One of the most numerous pieces of advertising handed out at the fairs this fall was the pictures of two women—one drawwater from a faucet, the other standing in the snow, with a shawl around her shoulders, pouring water from an ice-covered bucket into a pail sitting by the well curb. The fact was brought out that by the latter method of securing water, the women of the farm were exposed to the danger of colds, pneumonia and other diseases which are liable to result from exposure during inclement weather.

The difference between these two methods of getting water may be most easily expressed in terms of money; somewhat less than $100, if the water is brought into the house by pressure tank and pump, or $10 if the commodity is pumped into the house with a small hand outfit. Yet, with the winter coming on, many farm men and women will begin another season of water carrying, with scarcely a thought about it, although the amount necessary to correct this is less than it would cost to insure against accident from this source.

If the risk of breaking a limb or contracting pneumonia is not sufficient to induce a thinking person to bring water into the kitchen or barn, that of wasting time, making countless steps and carrying tons of water in the course of a season should make it sufficiently strong to produce serious thought and consideration.

When we stop to consider the amount of useless labor performed on the farm to supply water, the fact is appalling. Suppose that, due to inconvenience in water supply, 20 minutes each day are spent in pumping water or perhaps leading the live stock to the spring a few rods away. Allowing the farmer 20 cents per hour for his work, in a year he would practically spend $30 with nothing to show for it.

This amount, applied upon an up-to-date water system, would return four times the amount in interest on the investment. There are a number of water supply devices on the market now which will relieve much of the drudgery of the farm.

Practically every farm has an abundant amount of water, which only needs proper harnessing. The hydraulic ram, the windpump, the gasoline engine, the storage tank and the later pressure systems will solve the water supply problem, reduce the labor to a minimum and insure less danger from accident and exposure.

JOE WING MEMORIAL.

Joe Wing was Ohio's son. He loved Ohio as no other man; he worshipped Ohio's hills; he gloried in her valleys, and he bathed his spirit in the production of her plains.

The farmers of Ohio were his constant thought. He encouraged the youthful generation to associate with the beauties of agriculture; he poured forth such a wealth of ruralisms that the laboring farmer could easily catch between the hours of toil and sleep.

He had an affection for the humble and a deep appreciation for the striving man. He worked incessantly always striving to teach some truth with no ambition for power other than the enlarging of his opportunities for service. Although his journeys in behalf of better agriculture took him to far countries, his interest ever centered around Ohio.

We as students will never forget the few lectures he delivered at the Ohio State University. His ideals of fraternalism, his gentle persuasiveness, his intimate appeals were shown in an address before the graduates of the two-year course on June 5, 1913, when he said: "If you could gather together a little group of young men and women on Sunday afternoon and lead them afield to see the fruit of your work on the home farm, little by little the gospel of better farming would spread in your neighborhood."

It is particularly fitting that the students in the college of agriculture, in respect for the interest and fidelity which the apostle of agriculture has shown to Ohio and to Ohio State University, should be interested in the project of establishing a memorial to him. It has already been suggested that a scholarship fund at Ohio State would be appropriate, and with that end in view every student should feel that he can contribute, if only in a small way, to the man who "though dead, liveth."

POPULARIZING SCIENTIFIC EXPERIMENTS

Believing that scientific bulletins are unpopular with the farmer and that they do not pave the way for better agriculture as they might, the Ohio Experiment Station has inaugurated a new plan whereby the results of experiments will be published in the form of a monthly journal, written much like our farm papers.

The change has been well intended. It does not imply that experiment station men and scientists cannot write, nor that farmers are not able to grasp the facts in the bulletins, but it recognizes that the work of extending the facts to the farmers of Ohio is the business of another group of trained men—journalists.

It is frequently stated that "the scientist is twenty-five years ahead of the professional man, the professional man 10 years ahead of the layman." Yet the experimenter admits that his work is simple, plain and ordinary—only those things which can easily be understood—things which are within common reason. What, then, is the reason that valuable facts disclosed by our scientists come so slowly into use? They have never been presented before the laymen in a plain, conversational manner.

It is always the aim of the journalist to present the facts as clearly as possible to the reader. This is why the newspaper makes plain the most complicated law, the latest invention, etc. In this manner it will be possible to present the results of seemingly complicated experiments tersely, accurately and plainly, so that the benefits may be quickly and easily grasped by the farmer.

FOR the remainder of the year the department of secondary agriculture will endeavor to give monthly references and outlines which can be put to practical use in the regular work of the high and common schools of the state. The subject of School Agriculture is a comparatively new one. It should not be a "lock-step," text-book study. The outlines given will necessarily be general in their nature. A live, wide-awake teacher of agriculture can make many additions and applications of a local nature which will lend interest to the classwork and bring the school nearer to his community.

One of the pleasing and instructive features of many county fairs has been the boys' stock judging contest. The three boys from each county having the highest standing in local contests will receive trips to Farmers' Week at Ohio State University, where they will enter the state contest. Many of these boys are high school students. High school teachers of agriculture should have these boys well prepared for the state contest. If you are in need of material for the direction of this work, write the Agricultural Extension Department of Ohio State University. If your county did not have a contest this year, plan for at least a month's work in stock judging during the present school year, then ask your County Agricultural Society to give you a contest next year to be held at the county fair.

This is the month of agricultural exhibits and corn shows. Wayne county is planning a display of agricultural products which will include every school in the county. These exhibits can be made an annual event. Play contests can be prepared, such as corn judging, rope-tying and seed-stringing contests. If interested in play contests for meetings of this nature, you can secure valuable help from Prof. O. H. Benson, U. S. Department of Agriculture, Washington, D. C.

Farm Engineering Lesson—
Concrete on the Farm

THIS lesson is based on Farmers' Bulletin No. 461, U. S. Department of Agriculture, Washington, D. C. Much material can also be secured from the various Portland cement manufacturers.

1. Reasons for rapidly increasing use of cement on the farm.
2. Selection of materials in concrete construction.
3. History of cement. (See bulletin, "The Modern Farmer," issued free by Lehigh Portland Cement Co., Chicago, Ill.)
4. Quality of different materials.
5. Manufacturers of concrete.
6. Prepare a list of the different uses of concrete and discuss the advisability of its use in each case, taking into account local conditions.
7. Secure samples from local dealers.

Farm Drainage.

U. S. Department Bulletin on "Drainage" can be made the basis of this lesson.

1. What are the benefits of drainage?

2. Compare surface drainage and underdrainage.

3. Name the kinds of tile used and discuss comparative merits.

4. Duscuss depth of underdrains. What is the average depth in your vicinity? What is the determining factor?

5. What is the factor which determines the distance between drains? Many farmers have recently been lessening the distance. Why?

6. Discuss location of drains.

7. Discuss size of tile to be used, noting points given in bulletin.

8. Discuss tools and machinery used in ditching. Why has the use of ditching machines come into general use in many sections?

9. Discuss filling the trenches.

10. To what extent do roots of trees and growing crops affect drainage?

11. Discuss cost of tiling.

Farm Buildings and Machinery.

Care of farm buildings:

1. Some writer has said that a farmer and his community can be judged from the condition of the farm buildings. Discuss.

2. Why should farm buildings be kept in a good state of repair?

3. Discuss advantages in keeping farm buildings painted. (See Farmers' Bulletin No. 126.)

4. Discuss color of paints to be used.

Care of farm machinery:

1. Discuss progress in use of farm machinery.

2. Prepare a list of all machines and tools needed on an average farm of your community, giving approximate cost of each, thus finding investment.

3. Give three points in the care of farm machinery.

4. The average life of all machinery on the farm is estimated at seven years. If by proper care this average can be increased three years, what will be the return to the farmer, taking the investment as estimated (2) with interest at 6 per cent?

Farm Sanitation.

Bulletins giving material for this lesson can be secured from the U. S. Department of Agriculture and the State Board of Health, Columbus, O.

The water supply:

1. Compare surface and subterranean waters as to purity.

2. Discuss diseases contracted by drinking impure water.

3. How may the water supply on the farm become impure?

4. How may a pure supply be secured?

Dust:

1. Discuss results of the dry-broom method of sweeping.

2. Discuss value of sweeping compounds and pneumatic cleaners; sunlight and ventilation.

3. Why necessary for proper sanitary conditions?

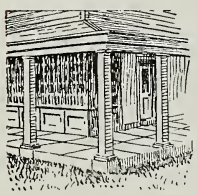
Accumulations of rubbish:

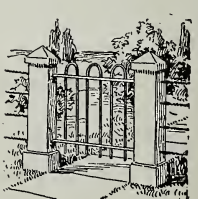
1. Discuss effects from the sanitary standpoint.

Disposal of slops and sewage:

1. How may they cause disease?

2. What should be the method of disposal?



STUDIES OF THE BIRDS

Features of Interest About the Feathered Songsters.

ROBERT CLELAND, Van Wert, Ohio

BIRDS, viewed from any angle, will well repay the time and effort bestowed upon them. If we belong to that class who believes in spending time only on the utilitarian studies, we need only look at the immense losses occasioned by destructive insects (variously estimated at from $500,000,000 to $1,000,000,000 annually in the United States alone), and realize that a large per cent of this loss might be averted had we a sufficient number of the beneficial birds, for birds are the natural enemies of insects.

This at once raises the question, "What are the beneficial families of birds? If we view them from the musician's standpoint, where else can we find so pleasing and so varied a repertoire, either in the solo or ensemble line? And, if we view them from the artist's viewpoint, where else can we find so great a variety of forms or of colors harmonizing so perfectly together and with their surroundings?

At the outset of our study it might be well to ask the question, "What distinguishes birds from the other classes of animals?" Is it flight? At least one animal, the bat, flies, while one bird, the ostrich, does not. Is it egg laying? Most reptiles and two mammals, the Australian Duckbill and the Echidnas, do that. Is it the number of chambers in the heart? Mammals have the same number, four. Is it incubation? Though this seems to be peculiar to birds, it is claimed that at least one reptile, the python, coils on its eggs. When it comes to the outside covering, however, we find that mammals and some insects are haired, reptiles and fishes are scaled, but birds alone are feathered. So that the covering of the body appears to be the only peculiarly distinguishing feature.

Some birds are aquatic; for example, the penguin. Others are terrestrial; for example, the ostrich. And still others are aerial, as the frigate bird. Between these extremes we find all manner and degrees of variation. If, as we all believe, they are descended from a common ancestry, why do they now differ so widely from one another? Can we account for the variation on the Darwin-Wallace theory of "natural selection?" What effect, if any, might "environment" have in this matter?

We find birds following the manner of life for which their structure is best adapted, and this gives rise to the question. "Is habit due to structure or is structure due to habit?"

The great outstanding fact of bird life is that of migration. True, not all birds migrate, for example, the quail, the cardinal and the blue jay, many of which seem to pass their entire lives within a few miles of the nest where they were hatched, but such a large per cent of them are migratory that we speak in a general way of "the migration of the birds." This, of course, naturally divides itself into the spring and autumn migrations.

The first question which one asks in this connection is "Where do the birds migrate?" And the answer must be conditioned upon the family or species being studied. Some winter in our southern states, some in the West Indies, some in Central America, others in the northern part of South America, and others in Central South America, while at least one little feathered friend

comes from Canada to the latitude of Ohio to spend the winter, the snow bird.

The greatest traveler of which I have ever heard is the American golden plover, which winters in Patagonia, where it leaves in March and travels to its summer home in the neighborhood of the Arctic Circle, which it reaches about the first week in June. It hastily constructs a nest and rears its young so that they are able to take the trip to Labrador in August, where they feast on the curlew berry for several weeks and store up a surplus of energy for their southern journey. After three or four weeks here they travel to Nova Scotia, from here striking out boldly over the sea for the eastern mainland of South America, a distance of 2,400 miles, with only two stopping places en route. The Bermuda Islands, 800 miles from Labrador, and the Antilles, 1,000 miles farther, are visited, and they have been known to scorn even these and to make the entire trip without once landing on the way. Can you imagine a greater traveler than this bird, which migrates each year of its life not less than 18,000 miles? And yet this bird is but one inch longer and has but two and one-half inches greater spread of wing than our familiar Killdeer, of which it is a cousin.

Of the birds that frequent Ohio, the bird which has the greatest range is probably the nighthawk. For the limit of its northern migration is Alaska and its southern limit is Patagonia, a distance of about 115 degrees. It is not probable that any one bird travels this entire distance, but a conservative estimate would make the distance traveled by each bird probably about 5,000 or 6,000 miles each way.

The second question which is naturally suggested is, "By what routes do they travel?" A few of those that go to South America go by way of Florida, West Indies and Antilles; some go by way of Cuba and Jamaica, crossing the gulf from there to the mainland; others cross the gulf from northwestern Florida direct to the mainland; still others take the longest possible flight, from Louisiana across the gulf, and a few cross from Cuba to Yucatan. The return trip is frequently made by a different route.

The third question is "How do they find their way?" After having seen a bird fly from the top of a forest tree across the street to the lawn in front of the porch where we were sitting in Cleveland one evening and light by the side of and pick up a small angle worm, we cannot doubt that their vision is keen enough to be of assistance to them in migrating; but the main guide would seem to be the sense of direction, which in the human family is imperfect. In the lower animals, however, it is more perfectly developed. They have been known to fly over a large body of water in a dense fog, and yet fly as straight as though guided by chart and compass.

We have suggested only a few of the many interesting questions which suggest themselves in the study of birds, but hope that enough has been said to cause some one to become sufficiently interested to take up the study.

WHAT THE BUSY GRADS ARE DOING

RALPH S. CHRISTEN, '17

Prof. Harry C. Ramsower, now head of the agricultural engineering department at Ohio State University, was born in Granville, Licking County, Ohio, After completing a preparatory course in Doane Academy, Denison University, in 1902, he entered the college of engineering at Ohio State. However, he changed to the college of agriculture the next year and was graduated in 1906.

At this time the faculty offered a scholarship of two years in the college of engineering, which Prof. Ramsower accepted, taking special work to prepare him to teach agricultural engineering in the college of agriculture. After completing this work, and with a view of starting the agricultural engineering courses, he spent the summer of 1908 studying similar work in the ten largest universities in the United States, from Cornell to Colorado.

Until September 1, 1914, Prof. Ramsower was the only instructor in this work, the course being given in the department of agronomy. At this time, however, the agricultural engineering department was created, and Frederick W. Ives came in as instructor in farm architecture. In September, 1915, George W. McCuen of the University of Illinois was selected as instructor in farm power, and likewise Virgil Overholt, '15, became extension representative of the department. The laboratory work of the department now requires all the space afforded by two floors of the machinery shop, an 80x100 building. The class rooms, drawing room and offices occupy the main part of the second story of the horticultural building.

The department now offers instruction in machinery, farm structures, farm power and drainage, the classes having an enrollment of 240 four-year and 190 three-year students. The work has grown to such an extent that at the next session of the legislature an appropriation of $125,000 will be asked for an agricultural engineering building, to be erected on Neil Avenue, opposite the Judging Pavilion. "It is to be half way between the agricultural and the engineering colleges," says Prof. Ramsower.

While Prof. Ramsower has been tireless in his efforts to serve the students at Ohio State University through his department, he has never lost sight of the practical application of the work,

for on his 80-acre farm near Granville he has an equipment of machinery equal to that on any 250-acre farm in Central Ohio. This includes a full line of potato tools, hay machinery and engines, etc. The buildings on the farm are complete; every one has either a brick or concrete foundation; the hog barn has attached to it a 25x40 brick feeding floor. The farm is entirely fenced with woven wire, supported by steel posts.

Clad in blue overalls and a plain shirt, Prof. Ramsower spends his vacation months on the farm, working out many of the problems which come up in the teaching of agricultural engineering.

Leland E. DePriest, '14, and Miss Muriel Lamb, were married in Dayton on October 6. Mr. DePriest is in charge of the horticultural department of Moraine Farm. They will live in Dayton. ton.

N. R. Elliott, '14, who was assistant in the horticultural department last year, is now acting in the same capacity at the Kentucky State University at Lexington.

Frederick W. Cowles, '15, is teaching commercial branches in the high school at Martin's Ferry, Ohio.

Raymond E. Shook, '15, is testing milk for a cow testing association at Newark, Ohio.

Hugh McAnall, '14, and Edith Williamson, ex-'15, were married September 29 at the home of the bride's parents in Columbus. They will be at home on a farm near Iberia.

Herbert L. Andrew, '15, is field assistant in farm management at the Ohio Agricultural Experiment Station at Wooster.

Lucius B. Nettleton, two-year course, '15, is employed on a dairy farm near Medina.

Charles Stokes, '14, is in the fruit growing business near Fremont, Ohio.

Robert M. Salter, '13, M. Sc. '15, who was assistant in agricultural chemistry last year, is now working in the chemistry laboratory of the soils department of the West Virginia Agricultural Experiment Station at Morgantown.

W. Carl McQuiston, '14, M. A. '15, and wife are located at El Centro, Cal., where he is doing work at the Agricultural Experiment Station. Mr McQuiston was graduate assistant in botany last year. They are under appointment from the United Presbyterian board for missionary work in Cairo, Egypt, and are now awaiting word from the board to sail. He is to have charge of the organization of the agricultural college of Christian University, which is to be established in the chief Mohammedan center of the world.

Clarence K. Wildermuth, '15, is with the Bureau of Entomology, U. S. Department of Agriculture, Maxwell, New Mexico.

Frank N. Harsh, '15, is superintendent of schools at Hudson, Ohio.

Edgar G. Will, '15, who was student assistant in agricultural chemistry last year, has a position in the department of chemistry of the Arkansas Experiment Station at Fayetteville.

Earl Chenault, '15, is in the employ of the United States Civil Service, Washington, D. C.

Charles Salt, '14, is instructor in agricultural journalism at the Iowa State College of Agriculture at Ames.

Philip Rothrock, '08, is connected with the Bureau of Grain Standardization, U. S. Department of Agriculture, Fargo, N. D.

Harry E. Johnson, '15, is chemist in the dairy laboratory of Dr. L. H. P. Maynard, '04, of Philadelphia.

Stanley Williams, '14, is instructor in manual training and agriculture at Pataskala.

Walter Williams, '14, is practicing general farming on a 400-acre farm near Wilmington, Ohio.

Edwin A. King, '15, is farming at Vanlue, Ohio.

Ray P. Jones, two-year course '15, is doing official testing work for the dairy department.

L. P. Foster, '15, is operating a fruit farm at South Point, Ohio.

Clarence A. Dawson, '15, who was captain of the cross-country team last year, left June 17 for Allahabad, where he enters Christian College as a teaching missionary. He will teach horticulture and agricultural chemistry.

W. T. Owrey, '15, is engaged in fruit farming near Ironton, Ohio.

S. W. Philips, '15, is doing graduate work in the department of agricultural engineering.

Harold T. Powell, 12, and George Risley, '12, are running a thousand-acre farm in Brown County.

Allen R. Cramer, '13, is engaged in general farming at Wharton, Ohio.

Ralph F. Crim, '13, is director of agriculture in the schools at Slayton, Minn.

Louis H. Burgwald, '14, is dairyman with the Moraine farm laboratories, Dayton.

Clifton K. Elliott, '16, and Miss Josephine Williams, ex-'17, both of Mt. Victory, Ohio, were married October 27. They will reside on a farm at Mt. Victory.

Hubert Connarroe, '15, has charge of the county Y. M. C. A. work in Medina County, with headquarters at Wadsworth.

Samuel R. Guard, '12, and Miss Kathryn E. Darnell, arts '12, were married October 7 at the home of the bride's parents in Columbus. They will reside in Park Ridge, Ill. Mr. Guard was editor of the Agricultural Student in 1911-12, and is now associate editor of the Breeders' Gazette. Mrs. Guard was a teacher in the Chicago public schools.

R. B. Simon, '12, began his first year as dean of the College of Agriculture at Ohio Northern University, Sept. 1.

Cyril B. Harpster, '13, is at the head of the bacteriology and chemistry department of the Moores & Ross Milk Company of Columbus.

Oliver Gossard, '15, is now carrying on soil survey work in the vicinity of Toledo, Ohio., under the direction of the soil survey department of the Ohio Experiment Station.

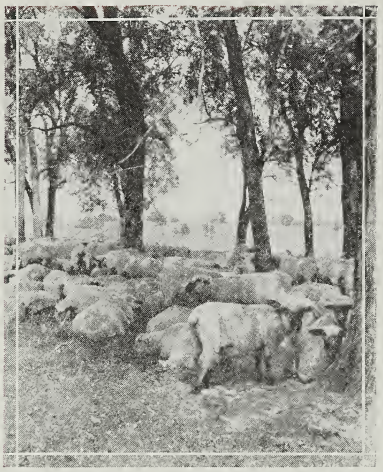
Walter Bausch, '14, is engaged in farming and dairying at Glen Rose, near Cincinnati.

Victor F. Tapke, '14, is spending this year at Cornell University, taking advanced work in bacteriology and other agricultural work.

Harry U. Simmermacher, '15, is teaching agriculture and manual training in the schools at Leroy, Ohio. He also edits the agricultural page of the Medina Gazette.

E. S. Bird is manager of the Walnut Springs Farm, Poland, Ohio. He specializes in Jersey cows and White Rock chickens.

W. L. Love, '14, is farming at Lockwood, Ohio.



LIVESTOCK ITEMS

C. T. CONKLIN, '16.
J. B. MARKEY, '16.

FORM GRADE ASSOCIATION.

FOR the purpose of improving the grade cow and advancing her owner's interests, the American Dairy Record Association was recently organized at Salem, Ohio. This association is to establish an official record for grade cows of distinctive breed characteristics and good dairy formation, provided they attain certain minimum productive requirements that can be certified by well-conducted cow testing associations. Entry into this association will be by the right of production and not by that of birth. Grade bulls will not be eligible to registry, and the breeders must use pure bred sires in order to record their cows in this association.

The following rules and regulations have been adopted by the association: The foundation stock must show distinctive breed characteristics, meet the requirements as provided, and have good dairy conformation. The breeding, markings and age are to be given as nearly as possible and are subject to classification by the official inspector of the association.

The female progeny of foundation stock ,if sired by a registered sire, is eligible to registry to the preparatory class if the applications are properly made and attested.

Females in the preparatory class will be advanced to the production class when they meet the requirements of the same. The male progeny of foundation stock will not be eligible to registry.

The production requirements shall be at least 360 points in one year, and they shall be credited as follows:

One point for each 100 pounds of milk produced.

One point for each pound of butterfat produced.

To this add:

1 per cent for first 3 months of pregnancy;

2 per cent for first four months of pregnancy;

3½ per cent for first five months of pregnancy;

6 per cent for first 6 months of pregnancy;

10 per cent for first 7 months of pregnancy;

20 per cent for first 8 months of pregnancy;

30 per cent for first 9 months of pregnancy.

No allowance is made for milk or fat production during the last 60 days of pregnancy.

To this should be added 1 per cent for each month that the cow is under five years of age at the beginning of the test. The records are classified as follows:

Class F—Preparatory class.
Class E—360 points or over.
Class D—500 points or over.
Class C—600 points or over.
Class B—700 points or over.

Class A—800 points or over.

Class AA—900 points or over.

Class AAA—1000 points or over.

After January 1, 1917, 10 points are to be added each year to the minimum requirements.

Records made by animals will be accepted for registration when they are made by competent testers under the supervision of accredited representatives of the association and when all fees and data are provided.

The fee for recording foundation stock is $2 per head and $1 for the preparatory. The fee for life membership in the association is $10, which shall entitle the breeder to register his stock at 50 per cent of the regular rates, to enrollment in the annual association roster and to the use of the association emblem on all his stationery and advertising matter.

THE popularity of the dual-purpose cow in America has grown rapidly with the general rise in the price of land and the scarcity of labor. The most recent development in the promotion of the dual-purpose animal is the new Milking Shorthorn Association, which was formed during the 1915 Minnesota State Fair.

The objects of the association are: "To encourage in America the breeding of Shorthorns that measure up to a high standard in the production of both milk and meat; to keep a record of their breeding, to be published from time to time in herd book form; to collect and distribute information regarding the performance of the animals recorded at the pail and on the block; to furnish assurance in the fact of registration that the animals recorded are possessed of the dual-purpose quality."

James J. Hill of the Great Northern Railway Company was made honorary president, and Prof. Thomas Shaw of the same corporation was made president of the new association.

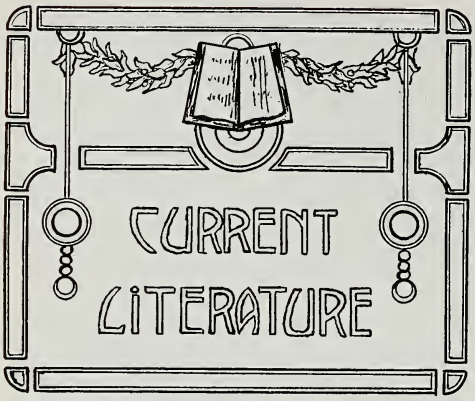
Mr. Hill is one of the strongest advocates of the milking Shorthorn in America and has done much to establish this breed in the Northwest by distributing good sires at popular prices to the farmers of that section.

The class in advanced live stock judging has made trips to several of the leading stock farms in the vicinity of Columbus during the past month. The different classes of animals judged were: Southdown and Shropshire sheep at Palmer's, Wagram; Angus cattle and Belgian horses at Dr. Brown's farm at Hillsboro, and at Hagler's farm, near Washington C. H.; Duroc Jersey hogs at Johnson's, Camp Chase, and Percheron horses at the Delaware pumpkin show.

The noted Clydesdale stallion, Bonnie Buchlyvie, was sold at the dispersion sale of the stud of the late Robert Brydon of Seaham Harbor, Scotland, for $26,500. Bonnie Buchlyvie was sired by the $47,500 Baron of Buchlyvie, by Baron's Pride, and his dam by Macgregor, by Darnley. He is the best bred of the present day sires among the Clydesdales.

Prof. William Hislop, formerly of the Ohio State University, and now of the Washington Agricultural College, has recently purchased from Carpenter & Ross of Mansfield, Ohio, the show calf, Maxwelton Foxglove V.

A national conference of experts on the foot and mouth disease will be held at Chicago November 29 and 30. The federal government and each state is expected to be represented, as well as the packers' and breeders' associations.



"The Holy Earth" by L. H. Bailey deals with the personal views of the author formed by many years of thought, study and contact with man's relation to the soil, both physical and spiritual. He treats of the practical questions involved, such as the conservation of resouces, but in such a way as to arouse the sense of basic character of nature with respect to intellectual and spiritual, as well as physical life. He reveals rare poetic gifts of vision and expression, employing them in such a way as to make the reader feel the truth. $1.00 net. Charles Scribner's Sons, New York.

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"Fungous Diseases of Farm and Garden Crops" by Thomas Milburn and E. A. Bessey is a work which the authors present in a form capable of being understood both by students and agriculturists, a brief discussion of each of the more important diseases of the common field and garden crops. This book is the result of an effort to combine simplicity and scientific accuracy in a way which makes it especially valuable to the general farmer, who frequently lacks the technical knowledge to understand some of the more pretentious technical works on the subject. 118 pages, $0.65 net. Longmans, Green & Co., New York.

"Making Horticulture Pay" is a recent work from the pen of M. G. Kains, whose dominant idea in presenting the book is to encourage the average farmer to emancipate himself from the routine still too common in farm living, to make some of the barren spots fruitful and to eliminate some of the drudgeries commonly associated with this phase of agriculture. The book is full of practical suggestions, as the author has striven throughout to present the experiences of actual and practical farmers. 276 pages, $1.50. Orange Judd Co., New York.

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"Farm Structures" by K. J. T. Ekblaw has been purposed to provide a treatise concerning farm structures which will appeal not only to the teacher who desires to present the subject to his students in a straightforward and practical way, but to the progressive farmer who recognizes the advantage of good farm buildings. Descriptions of the more essential requirements in the way of equipment and conveniences are appended. Illustrated, 347 pages, $1.75. The Macmillan Co., New York.

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"Rural Hygiene" by H. N. Ogden is a volume of the Rural Science Series, and puts before the rural population a systematic treatment of those special subjects included in what is popularly known as hygiene, as well as those broader subjects that concern the general health of the community at large. Two distinct purposes have been in the mind of the author throughout— to promote the comfort and convenience of these living in rural communities and to emphasize the interdependence of rural and urban communities in the matter of food products and contagious diseases. Illustrated; 434 pages, $1.50. Macmillan Co., New York.

"Barn Plans and Outbuildings" has recently been revised by Edwin C. Powell, associate editor of the American Agriculturist. By this revision the work has been brought up to date, having the most modern styles and plans of buildings. It is designed for the professional builder, and every person, be he farmer or otherwise, who intends to erect a building of any kind. A wealth of designs and plans are given for a comparatively small cost. 388 pages, $1.00. Orange Judd Co., New York.

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"Market Dairying and Milk Products" is a production of John Michaels, who has had wide experience as an instructor, as well as of that of a practical dairyman. Realizing the urgent and increasing needs along this line of dairying, the author, through knowledge and experience thus gained, has arranged the material in such a manner that it answers the needs of both class room and the dairyman who can not attend a dairy school. 372 pages, $1.50. Published by the author, Farmingdale, New York.

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"Agricultural Drawing," by Thomas E. French, professor of engineering, and Frederick W. Ives, assistant professor of agricultural engineering, both of Ohio State University, is designed for the progressive farmer as well as the student who wishes to acquire a knowledge of technical drawing. The book was written to bring to the farmer in reality a new language in which to express and record his technical ideas. It teaches how to read agricultural drawings, "to scale" buildings and to estimate costs. Formulas, tables, etc., are given; also a list of books and bulletins on allied subjects. 125 pages, $1.25. McGraw Hill Book Co., New York.

"Feeds and Feeding," a revised and rewritten edition by Profs. Henry and Morrison of Wisconsin University, presents in a brief and simple manner the most important facts concerning the science and the practice of all phases of live stock feeding. The reader with only a common school training may easily understand it, and it is so accurate and complete that animal husbandmen of the agricultural college acknowledge it to be the most authoritative book on live stock feeding. Part I discusses the principles of animal nutrition, dealing with the most recent discoveries of the biological chemists; Part II deals with the economical feeding of farm animals, and Part III presents the most important findings obtained by experiment stations on the value of feeding stuffs, various methods of preparing feed and systems of feeding and caring for live stock. A loose-leaf manual prepared by E. S. Savage of Cornell University for the use of students who wish to prepare practical problems, is also sent with the book. "Feeds and Feeding," 680 pages, $2.25; "Manual," $0.80. The Agricultural Student, Columbus, Ohio.

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"Studies of Soils" by A. G. McCall, professor of agronomy, Ohio State University, has been prepared in response to the demand for a brief laboratory and field course in soils which may be given without the purchase of extensive equipment. The text deals with the formation of soils, composition of soils, the pore space of soils, mulches, drainage, soil management, etc. The lessons are arranged in logical order, but it is not necessary to study them in the exact sequence, so the teacher can vary the study to the season. 85 pages, $0.75. John Wiley & Sons, New York.

HORTICULTURAL NEWS AT OHIO STATE

Apple Judging Team Competes in Contest at Baltimore, Md., Nov. 19.

ISAAC P. LEWIS, '17

THE DELAWARE PUMPKIN SHOW

While the Seventh Annual Pumpkin Show, held at Delaware, Ohio, October 13-16, is known as a pumpkin show, it is not to be supposed that the pumpkin is the only article on exhibition. Pumpkins did adorn every show window and were to be found in varying forms from the small pie to the huge Yankee, which weighed in the neighborhood of 80 pounds. It was awarded the $5.00 prize for being the largest on exhibition.

However, the fruit exhibit was of special interest, and for a show of this size it was much above the average, being almost entirely free from insects, diseases and mechanical injury. The varieties shown were the Baldwin, Stayman, Grimes, Opalescent, Jonathan, Ben Davis, etc.

D. D. Leyda, '16.

Studying the principles of orchard management and marketing of apples, twenty students in the pomology class visited the farm of Homer C. Price, former dean of the college of agriculture, at Newark, Licking County, October 16. Mr. Price has a large orchard which will yield about 3,000 barrels of apples this year. At noon Mrs. Price served the party with hot coffee, doughnuts, cider and apples. While returning to Newark, the campus of Denison University at Granville was visited. The trip from Newark to the home of the former dean was made in autos.

The Intercollegiate Apple Judging Contest will be held on the 19th of November at Baltimore, Md. It will be held in connection with the Maryland State Apple Show, which is considered one of the best shows in the East. Seven state universities will be represented in the contest, including Ohio State.

PLAIN CITY CORN CARNIVAL.

The second annual Corn Carnival, held at Plain City, Madison County, Ohio, October 19-23, drew large crowds. True to its name, it was a corn carnival, the booths being covered almost exclusively with fodder and corn. The exhibits of corn were of the best and showed that interest is taken in producing fine corn in Madison County. The fruit exhibits were also good, showing that, even if corn is raised very extensively, they have not lost sight of the fact that apples are a money-making crop. First-class specimens of all the common varieties of apples were shown, as well as an extensive display of vegetables, consisting mostly of pumpkins, potatoes, cabbage and celery. One of the notable features of the show was the large cash premiums given, and almost all of the exhibitors found that it paid them financially for their time and trouble. During the afternoon of October 20, Dr. W. O. Thompson and A. P. Sandles gave addresses to large audiences. J. D. Forsythe, '16.

The Horticultural Society will stage its Fifth Annual Apple Show in the auditorium of the Horticultural Building, December 9, 10 and 11. This year the society has decided to extend the scope of the show to include exhibits of apples, vegetables, flowers and landscape materials. It is also planned to have an extensive exhibit of diseases and insect injuries to apples. It is the desire of the committee to make this

show larger and better than any previous affairs of the kind, and a premium list will be published offering prizes whose value will probably amount to $400 or more. Students in the agricultural college are invited to enter exhibits in any or all of the classes decided upon. Premium lists may be obtained from the Apple Show Committee in the near future. M. C. Nauts, '16.

GARDEN NOTES.

In addition to experimental commercial crops, there are in the greenhouses test plots of radishes and lettuce containing 15 or 20 varieties each, and spinach in ten varieties. These are being grown for the use of the students in the systematic vegetable gardening class.

The new greenhouses now being completed consist of a central palm house and conservatory, a students' work room, with a mushroom and root-forcing cellar beneath, a plant house, a propagating house and a head house connecting the conservatory with the carnation house built last spring.

Merrit Nauts and Albert Kette are conducting a series of experiments with lettuce in the greenhouse, involving a study of the effects of soil, moisture and fertilizers upon the lettuce crop. Two distinct types of soil are being tested, and each type of soil consists of a series of plots which are to be treated with a variety of kinds of fertilizers and various amounts of water in an effort to determine the best treatment for the soils devoted to lettuce production.

About 30 varieties of tomatoes were started early in the fall, with the expectation of being able to fruit them in the houses now under construction, but owing to the delay in completion, the best results are not expected, unless the weather continues bright until toward the holidays.

The class in by-products has been canning a considerable variety of vegetables in the laboratory. Work is soon to begin in working up the by-products of the fruits, principally apples. A test will be made of the comparative value of the several varieties of apples for cider making, canning, apple butter, cider jelly and cider syrup.

The Horticultural Department has received apples from Nebraska, Maryland, Michigan and Virginia, which will be used for classroom purposes to show the variation in varieties of apples from different parts of the country.

The Society of Horticultural Science has announced its program and will hold its meeting in the Horticultural Building during the Christmas vacation, at the same time as the meeting of the American Association for Advancement of Science.

The Ohio Horticultural Society is busy planning a large commercial apple show, to be given this winter in some large city of Ohio, possibly Columbus. This commercial show is something new and thought to be in advance of anything yet tried along the line of a state show.

The class in pomology, twenty-five in number, recently made an excursion to the Brown Fruit Farm, and during the afternoon picked three hundred bushels of apples.

Mr. I. P. Lewis, '17, was excused from school two weeks recently to do some work for the Ohio Experiment Station in southeastern Ohio.

M. C. Kibler, of Wooster, Ohio, who has been connected with the horticultural department of the Ohio Experiment Station for some time, is at present enrolled in the three-year course in horticulture.

NOVEMBER NEWS NOTES

FARMERS' WEEK, JAN. 31 - FEB. 4.

Combining the annual meetings of the Ohio State Dairymen's Association, the State Farmers' Institute, the Ohio State Corn Show and the Ohio Vegetable Growers' Association the fourth annual Farmers' Week, which will be held at Ohio State University, Columbus, January 31 to February 4, promises to be one of the greatest agricultural meetings ever held in Ohio. Sixty lectures by the leading farm authorities of the corn belt will form the three session, five-day course which will be offered free to the farmers of Ohio.

Practically every building on the campus of the University will be utilized for the event. Last year two sessions were given at the same time, but to provide for the large attendance expected, three lectures or demonstrations on different phases of farming will be scheduled simultaneously.

With a free trip already granted to three boys to the University from each of forty-two counties in which junior stock judging contests were held this fall, 126 youthful aspirants will clamor for the honor of being the best judge at the first state boys' contest, to be held at this time. They will be given instruction in judging and all will compete in the contest.

Showing 800 slides, selected from 2000 pictures taken on his trip around the globe, Professor Alfred Vivian of the University will deliver a series of daily lectures on "Around the World in Five Days." The slides will show agricultural conditions from a farmer's viewpoint in traveling over 42,000 miles in 21 countries.

INSTITUTE WORKERS' NORMAL.

One hundred persons, including farmers, stock raisers, fruit growers and dairymen, attended the second annual Institute Workers' Normal, which was held at the Ohio Union on October 27 and 28. President W. O. Thompson of Ohio State University, R. W. Dunlap, secretary of the State Board of Agriculture, and Prof. Alfred Vivian of the agricultural chemistry department, presided over the meetings. The speakers were: Charles E. Thorne, B. E. Carmichael and C. G. Williams of the Ohio Experiment Station; Profs. Arthur G. McCall, Alfred Vivian, C. S. Plumb, Donald J. Kays, J. S. Coffey, Wendell Paddock, Oscar Erf and Harry C. Ramsower of the college of agriculture;

Clark S. Wheeler of the extension department and John Begg, president of the Ohio State Board of Agriculture.

AGRICULTURAL OPEN NIGHT.

The agricultural college held an open night Saturday evening, October 30, at the Ohio Union. Eight hundred students and professors were present. Stunts were put on by the Agricultural Engineering Society, Townshend Literary Society, Horticultural Society, Jeffersonian Literary Society, Saddle and Sirloin Club and the Home Economics Club. The bushel of apples which was given as a prize for the best performance was won by the Home Economics Club, which presented "Public Opinion of Home Economics vs. Real Opinion." Cider, apples and doughnuts were served as refreshments.

Following an address by B. E. Carmichael of the Ohio Agricultural Experiment Station on "Feeding Experiments," before the Saddle and Sirloin Club, the evening of October 28, at the Judging Pavilion, the following officers were elected: Clifford T. Conklin, president; Clayton H. Elliott, vice president; Jesse E. Whonsetler, secretary, and Samuel W. Phillips, treasurer.

Urging the students of the college of agriculture to take an active interest in the affairs of their home community, Renick W. Dunlap, secretary of the State Board of Agriculture, addressed the members of the Agricultural Society at the first meeting of the year, Wednesday evening, November 3.

"Wake up the people of your community and get them in touch with public men and public work," he said. "Farmers should join the grange, for it is the only state and national farmers' organization existing. Through this organization the farmer will be able to secure best agricultural legislation in the state of Ohio and obtain representation in the work of the national government at Washington, D. C."

Following Institute Workers' Normal on October 27 and 28, the farm bureau conference, composed of the county agents and extension demonstrators of the University met at the Ohio Union on Saturday, October 29. L. A. Clinton of the States Relation Service, Washington, D. C., spoke on the farm bureau work. "Taking Farm Records and Figuring Labor Incomes," by G. N. Dagger of the extension department, was based on the farm survey records taken in Portage and Geauga Counties. Other speakers were D. W. Galehouse, county agent of Mahoning County; Clark S. Wheeler of the extension department, and Ivan McKellip, extension representative of the dairy department.

Harry W. Palmer, senior, has been chosen president, and Sherman L. Anderson, senior, secretary-treasurer for the third annual grain show, which is to be held in Townshend Hall during Farmers' Week, January 27 to February 3, under the auspices of the advance classes in cereal crops.

Presenting the features as they take place at a country sale, the University live stock will be sold "at auction" at the next regular meeting of the Saddle and Sirloin Club. According to the plan proposed, Colonel Perry, the well-known auctioneer of Clintonville will have charge of the event, "selling" the live stock to the students in the college of agriculture. Any student will be allowed to bid, paying "any price," but comparative judgment will be passed

on the amount bought and prices paid by the department of animal husbandry, who will name the best buyer. According to Clifford T. Conklin, president of the club, this feature has been carried on with good success at Washington and Nebraska Universities.

Joel L. Foote, senior agriculture, Cleveland; Brooks Drain, junior agriculture, Belpre, and Howard N. Scarff, junior agriculture, New Carlisle, were selected in the final elimination contest held recently as members of the apple-judging team which will represent the University at the Interstate Apple Show to be held at Baltimore November 19.

EXTENSION SCHOOLS, NOV. 22.

Ten thousand dollars will be used by the extension department of the University in conducting the 47 agricultural schools which will be held in various counties of the state. Beginning November 22 the department will send out three squads of instructors, who will conduct an extension school for a week at a place.

Of the $136,557 which comes to the extension department this year through the provisions of the Smith-Lever act, $40,000 has been appropriated for county agent work, $10,000 for special demonstrational work on Ohio farms, $17,000 for home economics extension work, and the rest for minor projects, such as correspondence courses, boys' club work and cow testing associations.

Last year 5000 persons received instructions at extension schools, 400,000 attended the farmers' institutes, and 40,000 were present at the various spraying, pruning and fertilizer demonstrations given by the department.

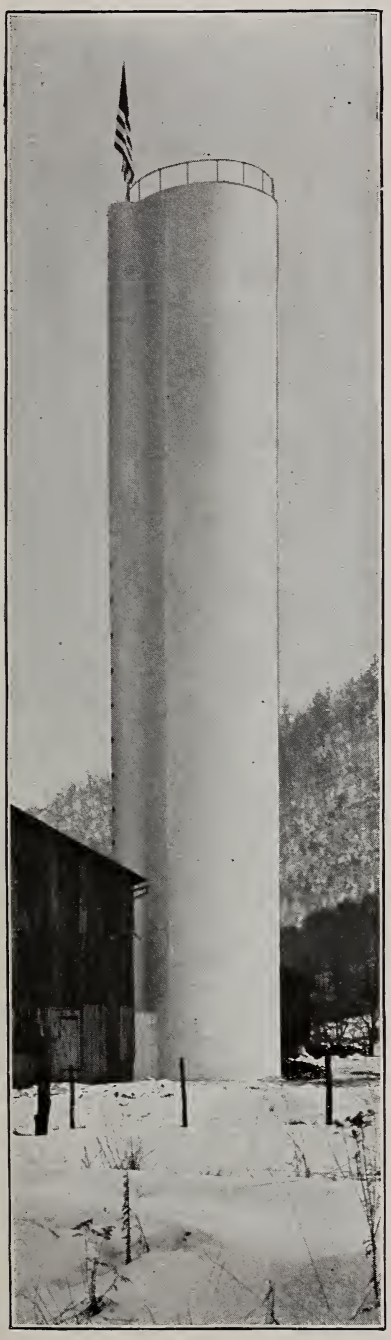
The department now has a staff of 49 persons, who are engaged the entire year in extension work. This includes the county agents, home economics instructors and specialists. Nearly every department in the agricultural college has a representative in extension work.

The extension department is the business agent of the University in instructional work. It takes to the farmers of Ohio the teachings of the agricultural college as laid down by the heads of the departments.

Dr. Carl S. Patton, of the First Congregational Church, and Renick W. Dunlap, Secretary of the State Board of Agriculture, spoke before the 1,500 students and members of the faculty who gathered in the chapel at 11 o'clock Friday, November 12, for Agriculture Day exercises. Lewis L. Guard, senior agriculture, chairman of the student committee in charge of the program for the day, introduced Prof. Alfred Vivian, new dean of the College of Agriculture, as presiding officer, and an ovation of several minutes followed.

"One of the silliest things we ever did in this country was to make the farmer the butt of the jokes in our funny papers; to hold him up for years, as we did, in our cartoons and manufactured anecdotes, as a long-whiskered, awkward individual with boots several sizes too large for him, with hayseed in his hair; to make ridiculous the man who feeds us all and upon whose labor rests ultimately the physical stability of the nation," said Dr. Patton.

Renick W. Dunlap, '95, Secretary of the State Board of Agriculture, spoke of the progress that universities have made in agricultural studies, and lauded Ohio for being the first state in the Union having an Agricultural Day. The Men's Glee Club sang several selections during the exercises.



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